AMERICAN CINEMATOGRAPHER

The Motion Picture CAMERA Magazine

this issue

Photographic Modernism
Using Supplementory Lenses
Cinemotographic Short-Cuts
Riddle Me This
. . . ond other features

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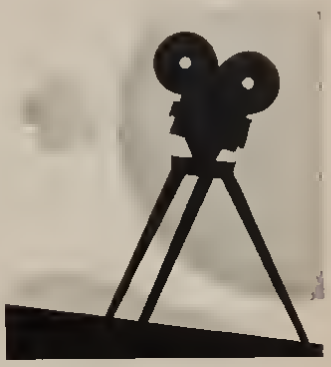

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- There will be other contributions from prominent directors of photography

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THE AMERICAN SOCIETY OF CINEMATOGRAPHERS was founded in 1918 for the purpose of bringing into closer confederation and cooperation all those leaders in the cinematographic art and science whose aim is and ever will be to strive for pre-eminence in artistic perfection and technical mastery of this art and science Its purpose is to further the artistic and scientific advancement of the cinema and its allied crafts through unceasing research and experimentation as well as through bringing the artists and the scientists of cinematography into more intimate fellowship. To this end its membership is composed of the outstanding cinematographers of the world with Associate and Honorary memberships bestowed upon those who, though not active cinematographers, are engaged none the less in kindred pursuits, and who have, by their achievements, contributed outstandingly to the progress of cinematography as an Art or as a Science To further these lofty aims and to fittingly chronicle the progress of cinematography, the Society's publication, The American Cinematographer, is dedicated

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Photographic Modernism and the Cinematographer

by

Karl Struss, A. S. C.

THE relationship between the so-called "Modern" school of photography and cinematography is a subject frequently discussed whenever photo-pictorialists or cinematographers foregather. Frequently in such discussions, I have heard cinematographers censured for not patterning their work more closely after this school, at other times, I have heard them as stoutly praised. The question is one, I believe, which should be of interest to all of us, whether engaged in still or motion photography.

This "Modern" school of photography is above all, a school of surrealism. Examination of any representative group of such prints reveals that, in almost every case, the artist is at great pains to achieve abnormally striking effect, either by unconventional composition, dynamic patterning of lines and masses, or by accentuatedly realistic rendition of textures. In more than a few instances, realism is carried to the length of exaggeration—especially by the portraitists, who make a fetish of securing exaggeratedly literal renditions of flesh tones and textures, and take great pains to reveal every possible facial blemish.

It is to be admitted that these portraits generally succeed in their apparent purpose. they certainly seize the eye of the beholder immediately, and often arrest it with an aesthetically paralyzing shock. Many prints of this type, modified slightly for commercial use, have proven themselves gripping advertising media.

This conception has undeniably infused new vigor into photography. It has made the still photograph a much more dynamic and interesting artistic entity than ever before.

But it is questionable whether the "Modernistic" technique has anything to offer the cinema—at least under existing conditions.

Cinematography in present-day dramatic films is not an end, but a means to an end, whereas the still picture is often, if not always, both the means and the end itself. Cinematography, while allowing ample room for artistic individuality, must necessarily subserve the dramatic element—the story. It must always remain the vehicle for this story, and as such, it may never call attention to itself at the expense of either story or players. Psychologists have frequently commented upon the fact that the essential appeal of the cinema is the illusion of reality, which enables the audience to merge itself into story and players, and thus to experience vicariously the situations and emotions delineated on the screen. If this illusion is to apply, the photographic treatment of the story must be such that the audience is unconscious of the camera. the viewer must forget that he is watching a series of projected shadows, and lose himself in conscious and subconscious self-identification with the pictured players.

Treatment of the average screenplay by the methods of the surrealistic school of still photography would hardly give this effect. It can hardly be said that the results of this technique are unobtrusive, since the technique overstresses eye-arresting design or over-detailed textural rendition. Applied to a dramatic film, such treatment would tend strongly to distract audience-attention from story to photography, and even, in extreme instances, to contemplation of the facial and physical defects of the players—all of which would at once destroy the illusion of reality, and accordingly lessen the entertainment-value of the production.

If modern-day dramatic cinematography may be said to belong to any school, it would be that of "idealized realism". we must strive to convey an impression, not alone of actuality, but of **perfected** actuality. Our aim is to show players and settings, not merely as they are, but as the audience would like to see them. Each scene must not only appear actual, but idealized to the extent at least of minimizing all disturbing elements. Very few of our players, for instance, have absolutely perfect complexions, and still fewer approach absolute perfection of line and contour. Accordingly, since audiences quite understandably prefer to see their favorites presented favorably, if not, perhaps, literally idealized, it is the Cinematographer's duty to minimize these physical imperfections, just as a portrait photographer must strive to please his clientele by presenting his subjects both faithfully and favorably.

In doing this, the Cinematographer's technical opportunities are greatly restricted in comparison to those of the portraitist. Where the still-photo worker has almost endless opportunities for controlling his results by modifying his purely photographic treatment of the negative, by retouching, and by infinite manipulation in the printing processes, the Cinematographer's sole point of control is in the photographing, the processes of development and printing are virtually automatic, and permit only a very minor degree of control. Thus, the Cinematographer must see to it that the picture he wants to see on the screen is impressed, complete in every particular, upon the negative when he makes his exposure. Make-up, diffusion, lighting, and carefully-chosen angles are the chief tools with which he must work.

This requirement inevitably debars him from much of the "Modernist" technique, the more so since his subjects —and accordingly, his picture—are in constant motion. A lighting-effect, for example, which might at one angle be strikingly effective, both photographically and dramatically, must often be discarded because a slight movement in either subject or camera would change the angle to one which would, with that lighting, show the subject unfavorably. This is naturally complicated when more than one player is in the scene, for a lighting or angle which may be effective for one, will often be equally unfavorable for the other player. There is, of course, the occasional exception of films of the "What Price Glory?" or "Lost Patrol" genre, in which the mood of the story demands surrealistic photography, but these are decidedly in the minority.

The reverse of this problem is often true, too. indeed, I believe that one of the basic attractions of the photographic moderns is the excellence with which their technique **suggests** motion in an actually static, motionless rendition. More than a few of the modernists owe their suc-

How motion can alter a forceful shot Lighting and subject are the same in both pictures, note that while the upper picture is quite effective, the changed position in the lower picture makes Lee Tracy's familiar features unrecognizable.

cess not so much to the understanding or application of pure photographic artistry as to an unusual knack of "freezing" motion with a speed camera

If you will examine the matter closely, I believe that you will find that much of this photographic modernism, in truth, had its inspiration in the achievements of the silent cinema Aside from photo-pictorial representations of still life, in which design has always played an important part, I do not believe that you will recall much photography of what is called the "Modernist" or surrealistic school prior to the release of the sensational German and Russian silent films of the early part of the last decade notably "The Cabinet of Dr Caligari" and "Variety," photographed by Karl Freund, A S C , and the Russian films of Eisenstein and Tisse It is to these films that much, if not all, of the "Modern" school owes its being—or, rather, to certain sequences in these films, since, despite their various innovations, they conformed to the laws of cinematography, making their unconventional technique a means to an end, rather than the end itself, and utilizing the conventional in its place, as well as the unconventional

Many branches of Modern photography have borrowed greatly from the cinema—even of the more conventional aspects of the cinema For example, the use of ultra-low camera-angles, so frequently seen nowadays in landscapes, was used by photographers of "action dramas" long before anyone dreamed that the cinema and cinematography could claim a place among the Arts Similarly, the angles chosen by the photographers of architectural subjects follow cinematographic practice as long evidenced in both exterior and interior cinematography, of capitalizing upon the design potentialities of a structure In the same fashion, much of the Modernist portraiture is much more closely related to cinematic "close-up" technique than to conventional portraiture, while both interior and exterior lighting plainly show the influence of the Hollywood Cinematographer

It is in the "Semi-Modern" school, as represented chiefly by the advertising photograph, that the cinematographic influence shows most plainly In these pictures, the aim is definitely to tell a story in pictures, the means used are closely akin to the cinematographic, and the result is definitely closer to the "Modern" than to the more conventional schools of photography In these pictures, the technique is, as a rule, such that the picture might well be a production still from a Hollywood studio, not only in purely photographic phases, such as lighting, make-up, and general treatment, but also in what might be t e r m e d "photo-narrative" technique the subjects are not posed for personal or compositional effect alone, but definitely to tell a story—whether it be Soap, Cigarettes, Scotch or Cheese Thus, whether the picture is a full figure, a group, or a big-head close-up, the treatment—like that of a motion picture scene—is not alone for the picture, but for its message, the story

There is, however, one branch of cinematography which might do well to borrow more extensively from the photographic "Moderns," even as they themselves have borrowed from the dramatic cinema This is the newsreel It is admitted that the newsreel weekly of today needs a new impetus if it is to maintain its position may not this well come from a more virile visual treatment of the news-events? If really forceful silent films of the majority of events were shown, rather than the tame and colorless scenes of today, which so patently show the restriction of bulky, cumbersome sound-equipment, our newsreels would make a great step forward Imagine the renewed interest in even the more prosaic news-events if presented on the screen with t h e force and virility of "Modernist" still photography—plus motion!

Using Supplementary Lenses

by
Frank B. Good, A. S. C.

WITH the development of centralized special-effects departments in most studios, the use by production cinematographers of special supplementary lenses has of late decreased. None the less, such lenses can frequently prove invaluable in meeting special photographic problems.

These lenses may be roughly divided into two classes: those that alter the angular field of the normal lens with which they are used, and "trick" lenses, which multiply or distort the image. Almost invariably, these lenses are incapable of forming a real image, and must therefore be used in conjunction with a normal photographic lens.

In the first group are the supplementary objectives which narrow the angular field covered by the lens, resulting in a larger image of any given object than could be obtained by the photographic lens alone. such lenses are commonly called magnifying lenses. Under the same general classification are supplementary lenses which have exactly the opposite effect, namely, to apparently increase the angular field of the lens, resulting in a relatively smaller image of any given object, these are commonly known as diminishing lenses.

In the former instance, a positive, or converging lens is used for the supplementary objective. This type of lens, it will be remembered, casts a real image, which may be focused upon a ground-glass or film. In actual use, the camera-lens is focused upon the aerial image formed by this photographic lens, and accordingly, the compound image cast on the film.

The diminishing-lens, on the other hand, is of the negative, or diverging type. Such a lens cannot cast a real image, but forms a virtual image, apparently in or in front of the lens, and which may be seen by looking at, or into, the lens. In use, such a lens is mounted in front of the camera and the photographic lens is focused upon this virtual image. The angular field embraced by such a lens can be considerably greater than that of a conventional photographic lens, and accordingly, the compound image on the film embraces a wider field, but with the image of any given object considerably smaller than would be the case with the smaller field of the photographic lens alone.

There are, of course, many practical difficulties incident to the use of such supplementary lenses. Obviously, such a lens must work under severe optical difficulties. it is usually a single lens, rather than a multiple combination like most modern photographic objectives. Therefore, many of the aberrations which are corrected in normal lenses by the use of different types of glass, with varying curvatures, etc., are always present to some extent in a supplementary lens. Spherical and chromatic aberrations are often inevitable, while in most such lenses the marginal definition falls off very rapidly. Inevitably, the majority of these flaws are transmitted through the camera lens (no matter how carefully corrected it may be) and to the picture. Similarly, distorting the angle of view generally results in some distortion of the image. However, if the curvatures of the supplementary lens are carefully calculated and accurately ground, these aberrations may be held to a minimum, and the lens made satisfactory for use in the special types of scene for which it is needed.

On the writer's last picture, "The Dude Ranger," use was made of such a lens, which enabled us to film scenes which would otherwise have been absolutely impossible. The lens used was of the diminishing type, and had been specially imported some time ago by Harry Neumann, A. S. C. The lens is of the concavo-convex type, and evidences fewer aberrations than any other such lens of my experience. It was mounted in a special mount attached to the matte-box arms of the camera, and replacing the matte-box. While it could, of course, be used with any lens, the greatest advantage naturally followed its use with a 24mm photographic objective. The horizontal angle embraced by the 24mm lens alone is approximately 50°, while the use of the diminishing lens increased this angle to about that of an 18mm lens, or approximately 62°, and without objectionable distortion.

The sequences on which this lens was used were made at the Grand Canyon, and in Zion National Park, on locations which, while of greatest natural beauty, it would have been impossible to secure satisfactory results with even the widest-angled normal lens. One scene made on the rim of the Grand Canyon permitted us to show, not alone dramatically adequate figures of the players, but a wide expanse of the background, as well. The players were on a rock jutting out over the edge of the canyon, while the camera was set up on the curving rim, about thirty feet from the actors. The players were placed in the upper half of the picture, and the extreme angle afforded by the diminishing lens allowed us to get pleasingly large and undistorted images of them, yet to show below them the full 5,000-foot drop down to the Colorado River, and to utilize some pictorial clouds above them. This shot would have been impossible otherwise. The problems encountered in Zion Canyon were equally difficult. The sequence was enacted in a small canyon, with the 2,500-foot high "Angel's Landing" towering in the background. Even with a 24mm lens, only a small part of this could be shown—and the shot would not be effective, either dramatically or photographically, if restricted to only a small part of the canyon and the base of the outcrop. Therefore, the diminishing lens was used, and we were able to include sufficient of the canyon floor to give us an ample stage for the action, together with the whole of the peak with plenty of "head-room" to make use of the fluffy clouds in the sky above.

We used this diminishing lens largely for long-shots, of course, and always with the 24mm lens. It did not alter the effective speed of the photographing lens, nor did it make any change in the manner of focusing. Due to the excellence of the particular supplementary lens used, very little distortion was noticed, except when objects very near the lens moved into the camera, and even this was within permissible limits. Naturally, with such an extreme wide angle, no matte box could be used, and finders were accurate only as a very rough guide in keeping following-shots centered. While we used a standard Mitchell camera, we were forced to use special, short arms to support the

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Spectral Sensitivity of Agfa Superpan

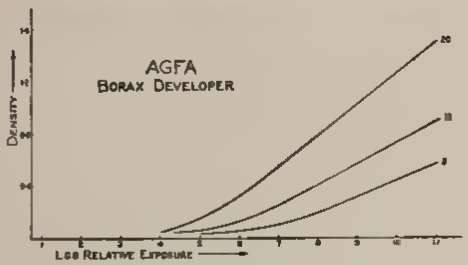

FIG 2 Characteristic curve of Superpan Agfa borax developer

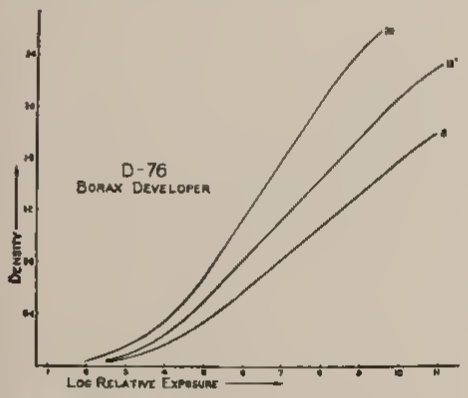

Fig 3 Characteristic Curve of Afga Superpan D-76 Developer

New Agfa Negative

by

Dr. Herbert Meyer, A. S. C.

IN MANUFACTURING negative film for general photographic use, that is, for reproducing naturol subjects in continuous monotane, the most important point is that of embodying in such a film the finest characteristics possible to onswer all practical needs For this reoson it is not, for instance, advisable to just manufacture only a type of extreme sensitivity to light, if in doing so other important factors are neglected Unfortunately, physical lows exist in photochemistry which limit the possibility of going to extremes in perfecting certain properties in the emulsion except at the expense of other veluable characteristics

To nome just a few of these and their relation to other ones we refer to the following

The possibility of increasing blue sensitivity is limited by the danger of increasing grain, fog, and that of decreasing keeping quality

The endeavar of the manufacturer to reduce grain-size is hindered by the danger af lasing speed and steepening of the gamma

From this it will be seen that, while the perfecting af a single praperty in the film does not offer any difficulty, thorough judgment ond amale theoretical and practical knowledge is needed to find the cambinatian that will produce the finest all-around results

The new Agfa Superpan has been designed and is manufactured with this consideration foremost in mind

Gradation ond shadow speed in Superpan have been carefully balanced to avoid any undesirable increase in grain-size In fact, it would be correct to state that this film-type has been especially built to answer the request for finer grain, which, in the opinion of the manufacturer, represents the most immediate need for improvement

Other properties of Agfa Superpan, which make it distinctly different from similar types available on the market, consist of the following

Superpan is provided with a gray anti-halo layer that is located between the base and the emulsion This offers the anly guarantee for complete absorption and prevention of halation by light reflectian The gray tint of this layer becomes somewhat lighter in the developing process, which is considered an advantage, as it helps to restore the correct balance of the printer scale that was distarted to a certain extent when gray-back types were intraduced This reaction, however, daes not affect the processing solutions in any way Special mention is also made af this peculiarity for the reason that, not knowing of it, ane might receive the impression that Superpan, judged from comparative Cinex test strips, is lacking in speed

A further special feature of Superpon consists of a very thin gelatine layer spread on tap of the emulsion, which serves to protect it against abrasians

The emulsion itself is composed of twa layers, each having distinctly different photographic characteristics The upper layer, when exposed in the camera, registers the shadows and medium tonal paits, while the second layer reproduces the highlights

Exposing Superpon in a sensitometer, one will find the straight part of the characteristic curve extending far over the medium range of densities that are obtoined in comman practice This unusual latitude is af value nat anly ta the cameraman because it takes core of the distartian of tone values caused by over-exposure, but because it indicates to anyone familiar with emulsian-technic, that Superpan is an emulsian type with unusual keeping quality, and therefore well protected against sudden or uneven changes in gradation which, with progressing age, cause disuniformity in emulsion batches

Figures 2 and 3 show the characteristic curves for two different developers and different developing times Figure 4 gives the time-gamma curve

Discussing the calar-sensitivity of this type we agoin point to the thoughts that were expressed in the intraduction

Continued on Page 309

Ingenious Cinematographic Short-Cuts

by
Walter Blanchard

MAKING a crane-shot without a crane—getting a dolly-shot without a dolly—a zoom-shot without a zoom lens — or light-effects without lights! These are some of the daily achievements of the men who photograph "quickies" — independently-made productions where everybody works on short rations of time, money and equipment In a major studio, the cinematographer has every possible resource at his disposal, and time and money are of less importance than perfect results but the cinematographer making the average independent film must get results without wasting either a moment or a penny A major-studio feature may cost from $100,000 up, and have a schedule of three to six weeks, independent budgets run from $20,000 to about $100,000, and schedules from six to ten days In the majors, a dozen scenes represent a nice day's work, but to meet an independent schedule a cinematographer must turn out from fifty to a hundred scenes per day Retakes, delays, and special equipment are impassible, and the indie cameraman must improvise right and left—and get it right first "take"

On one such picture, Jerome Ash, A S C, needed a large camera-crane or boom, though the budget wouldn't permit him to rent a regular one So he made one he placed a saw-horse on top of a parallel, and across it laid some heavy planks, for his crane-arm At one end, of course, was the camera and its crew, and as there were no weights which could be placed at the opposite end for a counterbalance, a member of the stage crew was pressed into service, and ran in and out from the fulcrum—a living, moving counterweight The shot was a success

For a similar shot, in which the crane was required to roll as well as to move, Alvin Wyckoff, A S C, improvised a boom by placing two 2x6-inch planks, properly braced, across the axle connecting a pair of old flivver wheels With a weight on the projecting short end of the planks, and the camera on the long end, Wyckoff had an excellent rolling crane, at no cost

Robert E Cline, A S C, on location at Big Bear lake, was suddenly told that the film must end with a dolly-shot, in which the camera moved up the hill to the lovers in their final embrace, then raised to shoot over them, showing the lake below the brow of the hill And no dolly or small crane was available! But Cline made a track from 2x12-inch planks, one end resting on the ground, and the other supported by a parallel Another 2x12, with a "high-hat" nailed upon it, was the camera-dolly A chain-type auto-jack was buried in the ground under the track, and provided the crane-action, while a generous application of axle-grease upon both track and "dolly" block made the movement smooth.

Cinematographer Ash recently had to make a dolly-shot with the camera moving up a long, narrow banquet-table, which was rendered narrower by many tall candlesticks It was impossible to suspend the camera normally from overhead, for the candlesticks were so tall, and so close together that the camera could not go between them, nor could they be removed So Ash mounted a parallel on an old four-wheeled dolly, extended a stout plank from the parallel over the table, and hung his camera—upside-down —beneath the plank Loading the feed magazine of his camera with the film reversed, he made his shot backward. far though the camera would not pass between the candlesticks, the thin magazines would, and did! Reversing the film, end for end, in cutting, made the scene run forward properly

James S Brown, Jr, A S C, recently needed a zoom-shot to cut into a sequence in which a player supposedly fell from a high building Brown placed a pulley in a window, on the top floor, and suspended a DeVry hand-camera —lens down—from a wire When this wire was suddenly paid out, the camera dropped down, revolving as it fell The result was a perfect shot of what the falling man would see

Brown also rigged up an interesting revolving-head support for his DeVry The camera slid into a square frame of strap-iron, attached to a shaft centered with the lens Two old bicycle-wheel hubs served as bearings for the shaft, and a bent tube made a crank The strap-iron base could be clamped to a tripod, or nailed to a post or parallel

Cinematographer Ash, in need of Akeley-type shots when the budget denied him the use of such a camera, mounted his DeVry on a gun-stock, with the shutter-release connected to a trigger With this, he was able to make swift follow-shots almost as satisfactorily as with an Akeley Later, in filming an air comedy, he made a low-flying plane do impossible stunts when he photographed it with this outfit and revolved the camera

How would you film a train-wreck if you could neither wreck a real train, nor use a miniature? Cinematographer Cline did so once by jerking a tripod-leg to tilt the camera as the train stopped; well-chosen camera-angles, which did not show the ground, gave the effect on the screen that the train tilted crazily In the later, post-wreck, scenes, the same idea of tipping the camera, with the actors leaning against the train at the same angle as the camera, carried out the illusion

Cinematographer Brown, when a comedy called for a follow-shot of a dog chasing a cat, buried an old Ford axle in the ground, letting one wheel remain above the surface On this, he built a wooden platform for the camera, and an upright with a wooden beam extending over the picture-field, permitted him to keep the animals in place with invisible wires—while they pulled the camera-turntable around with them

Alvin Wyckoff tells of a night-effect shot, in which he showed a cottage, apparently lighted and with the light from its windows streaming out on the ground No lights were available, but white paint on the window-panes, white rock-dust carefully spread on the ground, and a red filter gave a perfect effect

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RIDDLE ME THIS

The Riddle: It has been suggested that cameras might be made to operate more efficiently, and with less noise, if the take-up magazine, instead of being belt-driven, were powered by a separate, small motor. What do you think about the idea?

J. ROY HUNT, A.S.C.: There's a lot to be said on both sides of the question However, it is noticeable that a number of other machines used in the studios—recording machines, and the like—use a separate motor to drive the take-up, apparently with good results

THEODOR SPARKUHL, A.S.C.: Surely some more positive arrangement than the present belted drive would be an advantage In Europe, I have used many cameras in which a friction-drive was used for this purpose, and found it excellent Moreover, such a drive is absolutely noiseless

F. M. STAMPER, Asst. Head of Camera Dept., Paramount Studio: Something that would give a more positive drive than our present leather belting would be very helpful Under normal conditions, the belt-drive is adequate, but at other times it has serious disadvantages For example, when you are using a "synk" motor (which is not usually as powerful as our regular motors), and have the heavy load occasioned by a nearly full magazine, there is a good deal of drag and slippage Also, when on location, the damp atmosphere early and late in the day and at night makes the belt drag, even with the otherwise adequate power of our sound motors On the other hand, our magazine-noise does not come from the drive, but from the film-slap, and eliminating the belt certainly won't eliminate this noise

ANDRE BARLATIER, A.S.C.: No It is not the belt itself that makes the noise, but the pulley, the spool, the magazine and the film itself Just to put on a motor won't silence any of these noises Besides, the motor itself will add some new noises For example, there will be the hum of the motor itself, then, you will have to have gearing between the motor and the take-up, to allow for your varying speed as the roll gets larger—and this, too, will make a noise So you will just be adding more noise to something that is already noisy On the other hand, some more positive drive would be a big help I would suggest some type of shaft-drive, perhaps with the shaft built right inside the magazine

LEON SHAMROY, A.S.C.: Offhand, I don't like the idea It just means adding more parts—more complication—to our cameras, when we ought to be simplifying them Our cameras today are essentially the same as they were ten years ago—but with a lot of added parts and gadgets It's time for something new—something designed from the beginning for modern conditions, not old equipment cluttered up with makeshift additions Adding such a drive to present cameras would be merely adding a lot of extra parts to give more chances of mechanical and electrical troubles

J. DEV JEHHINGS, A.S.C.: As for as normal production cameras go, I don't think such a drive would be of much advantage, for it would be more likely to add noise and complication than to remove them For high-speed cameras, where noise isn't important, some more positive type of drive might benefit, I am inclined to favor either a geared shaft-drive, or a friction-drive There's quite a problem, though, in making such a drive compensate for the varying ratios needed, and still be simple

WILLIAM H. DIETZ, A.S.C.: Speaking from the viewpoint of the special-process cinematographer, I do not believe that it is necessary The greater part of our shots are made silent, often at speeds well above normal For this work, we have found that the old style spring-belt take-up drive is by far the best, as it gives little slippage, even at high speeds It is, of course, noisy, and sometimes this is a disadvantage, as, for instance, when working with animals, who hear the noise and grow camera-conscious So, while a separate take-up motor might perhaps be desirable for production cameras, I believe that for special-effects work we would do better to retain the simpler belt-drive

ALVIN WYCKOFF, A.S.C.: I don't believe there would be a great deal of advantage in it If the aim is silence, the motor-noise would probably cover up the magazine-noise, but it wouldn't eliminate it If the aim is a more positive drive, a separate motor, even though driving through some type of cluth or friction mechanism, would still have much the same slippage as our present leather slippage-belt drive In order to handle the load when the take-up magazine is nearly full, the motor would have to be large and powerful, this would alter the balance of the camera, and give more parts to be cared for, especially since such an auxiliary motor would have to be synchronized with the main motor, and pick up at least as fast as the camera-drive After all, the Assistant Cameraman has enough mechanism to care for already—so why add unnecessary parts?

ARTHUR TODD, A.S.C.: I think it would only be adding unnecessary complication As it is, the magazine is one of the quietest parts of the camera most of the noise comes from the motor, the intermittent, and the movement of the film itself Only after these have been really silenced will there be any excuse for altering the efficient slippage-belt drive we now use In designing an entirely new camera, however, it might be worth while to consider a positive take-up drive similar to that used on the Akeley camera which drives both feed and take-up through a positive gear-and-clutch arrangement, and is silent and dependable

HANS KOEHEKAMP, A.S.C.: I don't see any particular advantage in the idea, either for production cameras or for high-speed special-effects equipment It looks likelier to add noise than to remove it—and certainly it is adding extra equipment to be kept in order, and to be watched while the camera is running If any change in take-up drive were to be made, I would suggest some direct shaft-and-clutch drive from the camera mechanism itself, and powered by the same motor that drives the camera

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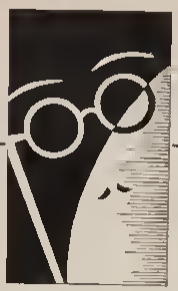


PHOTOGRAPHY of the MONTH

"THE GAY DIVORCEE" (RKO)

David Abel, A.S.C.: Directing Cinematographer
Vernon Walker, A.S.C.: Photographic Effects

Daily Variety (October 1, 1934). "—with the photography of David Abel and the photographic art effects of Vernon Walker being outstanding in workmanship quality"
Hollywood Reporter (October 1, 1934) "—and David Abel contributes class 'A' Photography"
Film Daily (October 3, 1934) Photography "A-1"
Motion Picture Daily (October 3, 1934) "The film is well photographed"

"MENACE" (Paramount)

Benjamin Reynolds, A.S.C.: Directing Cinematographer

Daily Variety (October 2, 1934) "Photography is very good"
Hollywood Reporter (October 2, 1934) "Benjamin Reynolds' photography is above average"
Motion Picture Daily (October 3, 1934) "The photography by Benjamin Reynolds aids much in offsetting the gruesameness of this type of murder-mystery story"

"DOWN TO THEIR LAST YACHT" (RKO)

Edward Cronjager, A.S.C.: Directing Cinematographer

Film Daily (September 22, 1934). Photography "Good"
Motion Picture Daily (September 22, 1934) "—and Edward Cronjager handled the photography, which deserves praise"

"THE FIREBIRD" (Warner Bros)

Ernest Haller, A.S.C.: Directing Cinematographer

Hollywood Reporter (October 5, 1934) "With the aid of Ernest Haller at the camera, he composes pictures of great beauty The photography and lighting throughout are magnificent"
Motion Picture Daily (October 5, 1934) "The photography of Ernest Haller is good"

"WHAT EVERY WOMAN KNOWS" (M-G-M)

Charles Rosher, A.S.C.: Directing Cinematographer

Motion Picture Daily (October 4, 1934). "There is fine photography by Charles Rosher"
Film Daily (October 5, 1934) Photography "A-1"

"KID MILLIONS" (Sam Goldwyn)

Ray June, A.S.C.: Directing Cinematographer

Hollywood Reporter (October 15, 1934) "Photography by Ray June is beautiful"

"LOVE TIME" (Fox)

Arthur Miller, A.S.C.: Directing Cinematographer

Daily Variety (September 21, 1934) "—photography okay"
Hollywood Reporter (September 21, 1934) "Photography by Arthur Miller is conventionally beautiful"

"WEDNESDAY'S CHILD" (RKO)

Harold Wenstrom, A.S.C.: Directing Cinematographer

Daily Variety (September 21, 1934). "Photography is okay"
Hollywood Reporter (September 21, 1934). "Harold Wenstrom contributes his share of beauty in the photography"

"STUDENT TOUR" (M-G-M)

Joseph Valentine, A.S.C.: Directing Cinematographer

Hollywood Reporter (September 21, 1934) "The photography is uniformly good"
Motion Picture Daily (September 24, 1934) "There is good photography by Joseph Valentine"

"WE LIVE AGAIN" (Samuel Goldwyn)

Gregg Toland, A.S.C.: Directing Cinematographer

Daily Variety (September 22, 1934) "The superb photography by Gregg Toland is notable"
Hollywood Reporter (September 22, 1934) "Really, not enough can be said for the photography by Gregg Toland—."
Film Daily (September 24, 1934) Photography "Expert"

"TOMORROW'S YOUTH" (Monogram)

Jack Mackenzie, A.S.C.: Directing Cinematographer

Hollywood Reporter (September 22, 1934) "—and Jack Mackenzie's photography is better than the film deserves"
Motion Picture Daily (September 24, 1934) "The photography by Jack Mackenzie is satisfactory"

"READY FOR LOVE" (Paramount)

Leon Shamroy, A.S.C.: Directing Cinematographer

Daily Variety (September 25, 1934). "Photography of Leon Shamroy is excellent."
Hollywood Reporter (September 15, 1934) "Photography is okay"

"ONE EXCITING ADVENTURE" (Universal)

Norbert Brodine, A.S.C.: Directing Cinematographer

Hollywood Reporter (September 26, 1934). "The photography is really something—"
"The one thing worthy of the whole whimsy-farcical idea is the photography by Norbert Brodine, that really is something worth looking at"
Daily Variety (September 26, 1934). "Norbert Brodine has photographed very well"
Motion Picture Daily (September 28, 1934) "The photography of Norbert Brodine is okay"

"BY YOUR LEAVE" (RKO)

Nick Musuraca, A.S.C.: Directing Cinematographer

Hollywood Reporter (September 27, 1934) "Nick Musuroca's photography is very good"
Motion Picture Daily (September 28, 1934) "The photography by Nick Musuroca is good"

Continued on Page 306

GIMBAL MOUNTED "EYEMO" FILMS BICYCLE RACES

● In photographing "Six-Day Bicycle Race,' an unusual photographic problem was encountered by Elmer G Dyer, ASC In photographing process backgrounds and running insert scenes it was necessary to mount the camera on a motorcycle which encircled the track with the bicycles The dramatic effect demanded that the camera be maintained in a level position, in order to show how the bicyclists took the steeply-banked turns Ordinary equipment and methods were found unsuitable, and on "Eyemo" camera, fitted with electric motor and 400-ft magazines was used

Therefore Dyer and Mike McGreal, head of the Warner Bros ' Camera Department, adapted a gimbal mount, ordinarily used for marine filming, for use on the motorcycle A steel framework, somewhat similar to a conventional luggage-rack, was built over the rear wheel of the motorcycle Upon this was welded a standard studio lamp-socket of steel tubing, and into this the base of a specially-made U-shaped yoke was fitted The yoke replaced a similar member of the gimbal-tripod, and supported the gimbal-head This head, working on the general principle of the universal joint, was counterweighted, so that regardless of the inclination of the support (in this case, the motorcycle) the camera remained level As will be seen, the mount was prevented from swinging up and down by rubber airplane shock-cord It is stated that this is the first installation of its kind known

The mounting of the Mitchell-type

finder above the camera, to replace the normal Eyemo finder, is also interesting, and adapts the camera excellently to this type of work, which demands a large and accurate finder

NEW SET-PLATFORMING SYSTEM

● A new system of set-platforming has been patented by David S Garber, well-known Hollywood Art-Director now with Universal Studios The invention is claimed to feature standardized construction, greater flexibility, reduced cost, and a safety-factor greatly in excess of that of present construction practice According to Garber, the cost of present methods of set-platforming averages $1 00 per running foot, while the new system reduces this cost to approximately 22 cents per running foot

The system is composed of standardized units throughout, being based on standardized wooden cat-walk (floor) sections, which fit into standardized U-shaped wooden supports, which are, in turn, suspended from the roof-girders of the stage by chains These chains are attached to hooks which fit over the roof-girders, and which may, if desired, be secured in place with nails The height of the lamp platform is adjusted by hooking the U-shaped supports onto the chains at different heights All of the hooks into which the chains are fastened are fitted with patented safety-locks, making it impossible for the chain to become detached accidentally The chains are to be marked at regular intervals with bands of distinguishing colors, further simplifying the height-adjustment

The flexibility of the chains not only permits placing the platform at any desired height, but also allows it to be placed at any angle necessary to conform to the construction of the set The floor-members are quickly locked into place in their supports, and further rigidity is given by horizontal braces between the supports Each chain has a tensile strength of 5,000 lbs , and since, according to Garber, the maximum load normally imposed upon any one chain seldom exceeds 500 lbs , this suspension system has an unusually high safety-factor

Garber has also patented a quickly-adjustible spotlight parallel, which should be a useful auxiliary to the system just described The same standardized cat-walk construction is used, but instead of being suspended, the platform is supported from the floor by extensible legs somewhat resembling an extension-ladder Cross-bracing between these end-supports is carried sufficiently high to allow normal camera-work, etc , underneath without interference The parallel is mounted on small wheels, and should be very portable

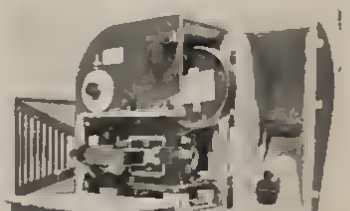
New Warner Blimp

● A new type of camera-silencing blimp is being put in service at the Warner Bros -First National Studios, according to Mike McGreal, head of the Warner Camera Department The blimp was designed by Al Tondreau, of the Studio's mechanical engineering staff, and Maj Nathan Levinson, of the Sound Dept , and constructed under the supervision of Frank N Murphy

Its outstanding features are simplicity, accessibility and convenience Wherever possible, locking handles have been reduced to one making for quicker operation the left-hand opening, which gives access to the camera-movement and finder, has but a single handle, as does the hinged sunshade, through which access to the lenses is had The entire rear section is hinged, and locked by two handles Unusually large windows are provided at the rear of the blimp, through which footage-meter, finder, etc , may be observed

The finder itself is inside the blimp, and mounted closer to the lens than is possible with exterior-mounted designs It is interconnected with the focus-control, and automatically corrects for parallax as the focus is changed The sunshade is unusually large, to accommodate wide-angle lenses, and has Kains-type louvres on the left side, so that the finder may be mounted close to the camera

The base upon which the camera itself is mounted has four-point, rubber-insulated suspension, and a special holder is placed inside of the blimp for standard 3-inch filters The base of the sunshade



contains a large optical-glass window, placed relatively close to the lens The blimp is of cast aluminum, lined with sound-absorptive materials and is said to have excellent sound-proofing qualities

TREND of THE TIMES

Etching Glass

● Revue Photo-Cinema gives the following recipe for engraving glass which may be of general interest Mix together in an ebonite or wax bottle the following

Water	6 fl ozs.
Ammonium Fluoride	14 oz
Sulphuric Acid (concentrated)	4 fl ozs

When thoroughly mixed, add 10 ozs of Barium sulphate, and the ink is then ready for use

Apply to the glass with a new pen-nib, and leave for five or six minutes If the deposit is then wiped off with a damp rag, a line will be found on the glass As this mixture is extremely caustic, the greatest care should be taken that it does not fall on any organic substances, and spills should be neutralized at once by a little ammonia on a rag

This will neutralize the hydrofluoric acid released from the solution

Telephoto Reflex Lens

● The Astro Co of Berlin is introducing an unusually long focal length lens for the miniature camera In addition this lens has the reflex feature

It consists of a reflex mirror, a long-focus lens and an eye-piece for focusing This particular lens has a focal length of 800mm (nearly 31½ inches) and has a maximum aperture of f5 Other lenses of varying focal length between this figure and 150mm (approximately 6 inches) are also available

One will realize the great magnification of this lens from the fact that when photographing an elephant at 100 yards the 31½" lens renders the animal too large to be completely included in the picture

This lens is roughly 30 times as large as the miniature camera on which it fits The complete attachment including cases weighs about 22½ pounds and the price is about a thousand dollars

Built-In Screens

● A British publication on Homebuilding and Architecture brings an interesting item for Cinephotographers

The designers of homes take into consideration the rapidly-growing number of Cine Amateurs and submit plans for new homes which include a special surfaced wall section in the largest room in the house This wall has a beaded screen finish that will serve as a projection screen

New Miniature Camera

● "Exakta" is a new miniature reflex camera using 35mm film This new camera is built and marketed in Germany by the Thagee Werke of Dresden.

It is equipped with a compur shutter that has a range from 1/1000 of a second to a time exposure of 12 seconds

It has a built-in automatic release for self-photography and a very fast lens with a speed of f1 2

Double Plate Process

● "La Photo Pour Tous," a French publication, tells of the possibilities of a new French portrait process The process calls for glass plates without the anti-halation coating Two plates are exposed together, one behind the other The first image will be normal and sharp and the second very soft and indistinct When printing, the two plates are put together and a very artistic and soft-focus portrait will be the result This process practically eliminates all retouching The finished print is the result of the sharp and the very soft plate combined Of course, great care must be taken that the two images synchronize perfectly

Stereo Tripod

● A very interesting tripod attachment for still cameras is being marketed in Germany It consists of a sort of sliding rod with inch markings

This enables the amateur to make stereo pictures with an ordinary single-lens camera After taking the first picture, the camera is pushed over sideways on this new tripod attachment, and the second exposure can be made The inch marking will assure the necessary displacement in order to obtain the correct stereo angle

Simple Retouching

● A French photo publication acquaints us with an interesting photographic process that allows the amateur to make very artistic prints with a new simplified retouching method

Mostly all amateurs shrink from retouching their negatives because it takes a skilled person to do good retouching However, with this process, all correction can be made by a beginner

Put your plate into the holder of the enlarger in the usual manner, focus your image on a clear piece of paper Make sure to fasten the paper with tacks. Then take a very thin piece of tissue paper and stretch it over the image, fastening it at three corners only Make your retouching with an ordinary pencil lightly on the tissue paper Always remember that every mark you make will be white on the print Having made the corrections wanted, slip your unexposed enlarging paper under the tissue paper, taking care that your corrections match with the image Expose and develop as usual

Your first attempt will be rather crude but with a little practice exceptionally beautiful effects can be obtained Remember the paper acts as a diffuser as well

New Dubbing System

● The "Film Suisse" tells about a new dubbing system invented by an Hungarian, Karl Pulvary His invention was recently demonstrated at the International Cinematographic Congress at Venice, Italy According to various European technical papers it was enthusiastically received It was absolutely impossible to detect the slightest variations from the original sound track

The basis of his invention is a double sound track, one for the original sound and a second track for a special recorder that registers the actual vocal sound into a non-language track which when projected compels the dubbing artists to use the same lip-movements as in the original sound version There are no technical details available of the construction of this special recorder

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PHOTOGRAPHY OF THE MONTH

Continued from Page 302

"LADY BY CHOICE" (Columbia)

Ted Tetzlaff, A.S.C.: Directing Cinematographer

Motion Picture Daily (September 29, 1934) "Theodore Tetzlaff's photography is an artistic contribution"

Film Daily (October 6, 1934) Photography "Fine"

"SIX DAY BIKE RIDER" (Warner Bros)

Warren Lynch, A.S.C.: Directing Cinematographer

Daily Variety (September 28, 1934) "Photography, particularly the race stuff, is excellent"

Hollywood Reporter (September 28, 1934) "Photography is first rate throughout, and the cameraman deserves special credit for the racing stuff, which was undoubtedly hard to get and was exceptionally well done"

"365 NIGHTS IN HOLLYWOOD" (Fox)

Harry Jackson, A.S.C.: Directing Cinematographer

Hollywood Reporter (September 28 1934). "Photography top-notch"

"ANNE OF GREEN GABLES" (Radio)

Lucien Andriot, A.S.C.: Directing Cinematographer

Daily Reporter (October 15, 1934). "Splendid photography by Lucien Andriot—"

Hollywood Reporter (October 15, 1934) "—and the photography is consistently good throughout"

"THE WHITE PARADE" (Lasky-Fox)

Arthur Miller, A.S.C.: Directing Cinematographer

Hollywood Reporter (October 17, 1934) "—and the camera work of Arthur Miller is of similarly high order"

Daily Variety (October 17, 1934) "Arthur Miller's photography is top-notch"

"CAPTAIN HATES THE SEA" (Columbia)

Joseph August, A.S.C.: Directing Cinematographer

Daily Variety (October 13, 1934) "Joseph August's photography is top-notch"

Hollywood Reporter (Octboer 13, 1934) "Joseph August had done lovely work with the photography"

"ENTER MADAME" (Paramount)

Theodore Sparkuhl, A.S.C., and William Mellor, A.S.C.: Directing Cinematographers

Hollywood Reporter (October 18, 1934). "Photography standard"

Daily Variety (October 18, 1934) "—photography are up to the general excellency of the other contributions"

Using Supplementary Lenses

Continued from Page 298

diminishing lens, as the normal Mitchell matte-box arms would have projected far enough forward to be included in the picture. The actual arms used were approximately 2/3 shorter than normal. For the same reason, it was necessary to be sure that the front tripod-leg did not project too far forward, and to see to it that no member of the company stepped even slightly beyond the camera's a person standing beside the camera, and as far forward as the front of the ordinary sunshade, would have found his shoulder filling one side of the screen!

The purely "trick" lenses are really a subject in themselves. While embodying the same general optical principles as the supplementary lenses just discussed, the "trick" lenses are designed to produce effects of a definitely distorted nature. Naturally, the more conventional magnifying and diminishing lenses have been used for trick effects, usually for comedy or weird effects from unconventional set-ups, but the majority of the "trick" supplementary objectives are specially designed to give absolutely abnormal effects — usually with multiple images. Such lenses usually consist of large optical flats, with prisms or small supplementary lenses cemented to them. Some of these multiply the image, expanding a single player, for example, into several, others reverse the image, and still others, made with combinations of small lenses which can be rotated, perhaps in two directions at once, give a stationary central image with identical images revolving around it. Such lenses are usually designed and built for a specific shot. In America, the use of such

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"trick" lens-supplements has been in a great measure superseded by the use of optical printing, but in Europe, where optical printing is not so widespread, these "trick" lenses are still in rather general use It was undoubtedly by the aid of such optical supplements that the bewildering optical effects in such films as "Variety" and "Metropolis" were achieved

side of a camera-car, and a camera-platform on the other Thus, driving along a mountain road, shooting through the wing and down at the valley below, his actors appear to be flying high in the air

INGENIOUS CINEMATOGRAPHIC SHORTS

Continued from Page 300

Dwight Warren A S C , was faced with the same problem, but as a girl had to appear in the lighted window, there had to be real light He solved it by photographing on the shadowed side of the house, and, with a system of reflectors and mirrors, reflecting a strong beam of sunlight through another window, into the room in question, and out again from a mirror behind the player

To stage an explosion without actually wrecking a set, Cinematographer William C Thompson, A S C , set a pan on the floor, close to the camera, placed some flash-powder in it, and fired the flash at the moment of the "explosion" He followed this with smoke from a smoke-pot, and, under cover of the smoke, made a quick lap-dissolve to a shot showing the set with the furniture disarranged, as though scattered by a blast Cinematographer Ash, when no smoke-pot is available, tells of using a small roll of film, tightly bound with a wire The inner end is pulled out an inch or so, and lighted, then pressed down into the roll The result is an excellent smoke-pot

Robert Cline, when in need of close-ups of a horse-back rider and neither a mechanical horse (to be fitted to a camera-car platform) nor any trick process work were available, has ridden alongside on another horse, and carried a DeVry or Eyemo in his hand Thompson goes this one better, in having made close-ups of a rider supposedly on a bucking horse —without any horse at all A saddle is placed on one end of a see-saw, the camera on the other—and with energetic stage-hands rocking the see-saw, no horse could buck better!

Another of Thompson's tricks is filming an aviator dropping bombs—without ever leaving the ground or even using an airplane! He built a wing on one

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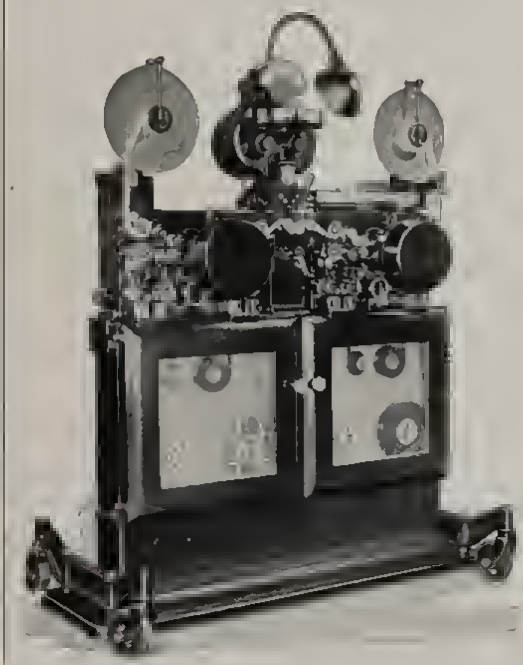

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PATENT DEPARTMENT

● We have arranged with JAMES ATKINS, registered patent attorney, Munsey Building, Washington, D C, to furnish us with a memorandum of the recently issued patents relating to improvements in our industry.

Inquiries with reference to this subject should be addressed to the Editor of the Patent Department, where they will receive prompt attention.

PATENTS

MOTION PICTURE PROJECTOR No. 1,974,423 Issued Sept 25, to Lodewyk J R Holst, Brookline, Po, and William Mayer, Lorchmont, and Harry Roy Menefee, Bronxville, N Y, assignors to The S M M H Corporation, Dover, Del

PHOTOMETER FOR DETERMINING THE TIME OF EXPOSURE FOR PHOTOGRAPHIC PICTURE TAKING No 1,974,492 Issued Sept 25, to Max Helfenstein, Lucerne, Switzerland

SOUND ATTACHMENT FOR MOVING PICTURE PROJECTORS No 1,974,921 Issued Sept 25, to Herbert F Jermain, New York City, assignor, to Movietonews, Inc, New York, N Y

FILM CONVEYING METHOD AND APPARATUS No 1,974,935 Issued Sept 25, to Leonard T Troland, Cambridge, Moss, assignor to Technicolor, Inc, New York City

DESIGN FOR A FRAME FOR A PHOTOGRGAPHIC MACHINE No 93,376 Issued Sept 25, to Michael Annick, Scranton, Pa, assignor to F. Wesel Manufacturing Company, Scranton, Pa

PHOTOGRAPHIC MATERIAL No 1,974,524 Issued Sept 25, to Arpad von Biehler, Dessau in Anhalt, Germany, assignor to Agfa Ansco Corporation, Binghampton, N Y

OPTICAL COMPENSATING SYSTEM (A Motion Picture Projector). No 1,974,573 Issued Sept 25, to Jacob F Leventhal, New York City

LENS FOR IMAGING SPACED OBJECTS IN REGISTER No 1,974,574 Issued Sept 25, to Jacob Fronk Leventhal, New York City

PHOTOGRAPHY No 1,974,653 Issued Sept 25, to Alfred Herz, Chicago, Ill.

TALKING MOTION PICTURE MACHINE No 1,974,688 Issued Sept 25, to George Francis Myers, Jackson Heights, N Y.

APPARATUS FOR MAKING SOUND AND PICTURE RECORDS ON FILMS No 1,974,709 Issued Sept 25, to Berthold Freund, Berlin, Germany, assignor to Internationale Tobis Maatschappij, N V., Amsterdam, Netherlands

METHOD OF MAKING SOUND RECORDS No 1,974,710. Issued Sept 25, to Berthold Freund, Berlin-Schoneberg, Germany, assignor to Internationale Tobis Maatschappij, N V., Amsterdam, Netherlands

FILM MEASURING DEVICE No 1,974,758 Issued Sept 25, to Joseph H Spray, Rutherford, N J, assignor to Warner Bros Pictures, Inc, New York N Y

SHUTTER FOR MOTION PICTURE MACHINES No 1,974,759 Issued Sept 25, to Albert W Tondreou, Hollywood, Calif, assignor to Warner Bros Pictures, Inc, New York City

CAMERA No 1,974,842 Issued Sept 25, to William A Block, Montclair, N J, assignor to Fairchild Aerial Camera Corporation, Woodside, N Y.

TELEVISION No 1,974,911 Issued Sept 25, to Heinrich Buecker, Hohenlimburg, and Hubert Buecker, Hagen Kabel, Germany.

Colored Rain Drops

● In a recent M G M production it was noticed that rain drops which were of great importance in certain scenes were hardly visible on the screen M G M camera experts had the ingenious idea of tinting their artificial rain slightly red The result was very satisfying

Yawitz in Hollywood

● Murray Yawitz of Fish-Schurman Corporation, American representatives of Jena Glass Works of Schott & Gen will be in Hollywood the middle of November to present to the studios, cinematographers and light manufacturers lenses and other items manufactured by their principles Among other things Yawitz will demonstrate some of the lamp lenses handled by his company.

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Riddle Me This

Continued from Page 301

WARREN LYNCH, A.S.C.: Our present type of take-up drive is quite dependable enough — and nothing could be quieter than the leather belts we now use Adding a separate motor for the take-up would not only add a good deal of bulk to the outfit Such a motor couldn't be very small but it would add complication, and uncertainty A little noise could perhaps be prevented by eliminating the openings through which the belt enters and leaves the camera-case but a simple shaft, which could even be placed in the waste space between the magazines, would take care of this But for positive drive, I couldn't ask anything better than the belt coupled with the clutch used at Warner Bros studios.

GAETANO GAUDIO, A.S.C.: I don't think there's any need for it—with our present cameras In a new design, it would be all right to try to improve the take-up, as well as a lot of other things, but remaking our old cameras, piece by piece, is too much like rebuilding a used car — no matter what you do, when you're through, you still have a used car!

New Agfa Negative

Continued from Page 299

to this article Considering the knowledge and experience of a large research laboratory that occupied itself for years with the discovery and the chemistry of photographic sensitizers, it will be apparent that the possibilities for employing extremely high red or yellow-green sensitizers are practically unlimited However, the selection of sensitizers for Superpan has been guided solely by the thought of creating a product of highest general utility

The present Superpan is distinctly different from former types manufactured by Agfa Ansco, especially regarding its color-response to red, which has been considerably lowered to avoid overcorrection mainly noticeable in flesh tones

Below is given a list of daylight filter factors carefully checked and covering the commonly used Wratten filters

Filter	Factor	Filter	Factor
K 1	1.6	12	2 5
K 2	1 9	C 5	6
K 3	2.2	56 B	7
AERO 1	1 25	3 N 5	4
AERO 2	1 50	5 N 5	5
G	3	25% N D	1 8
21	3 5	50% N D	3 1
23A	4	75% N D	5 6
25A	5	100% N D	10
29F	12		

Referring once more to the finegrain feature of Superpan as above mentioned, it should be observed that Agfa Ansco does not see the necessity for offering a finegrain film especially designed for background shots, because the grain size of Superpan is already such that its use for background photography is heartily recommended

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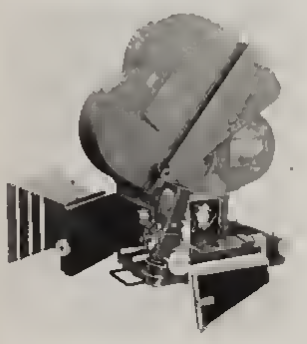

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New Small Crane

The Paramount Studio has placed in service a new small crane, designed and fabricated entirely within the studio. The wheelbase is six feet, the extreme width is thirty inches, and the weight approximately 900 lbs. At the lowest possible camera-position the lens-center height is 26 inches, and at the greatest elevation, seven feet.

The crane-mechanism provides both hand and power hoist, the latter driven by a D.C. motor and fitted with a variable-speed drive and automatic stops. The camera may be raised or lowered from one extreme to the other in any period from 14 seconds to 32 seconds.

The design is generally conventional, and aluminum alloys are used throughout. The steering wheels may be rotated through a 180° arc, so that the device will turn in its own length, pivoting on the rear wheels. At this end are two auxiliary rubber casters, normally fitted into the frame, and clear of the floor, but which may be dropped to lift the weight from the regular wheels for diagonal moves. Interchangeable handles operate this mechanism and the tie-down jacks, so that the footboard is normally left clear of obstructions.

The hoist is hand-operated from a crank on the main operating platform. The electric motor is under this platform, and controlled by a single switch at the base of the arm, in front of the platform, which serves as both switch and rheostat control. The motor is thrown in and out of gear by a control in front of the platform. The usual seat and lamp sockets are provided, and the camera is mounted on the standard blimp-type friction-head used at Paramount. In the crane this head is fitted with a special levelling mount, pivoted front and rear, and adjustible with leveling jacks at each side.

The crane was produced in the studio's Precision Machine Shop, under the supervision of Wm. Rudolph, with Arthur Zaugg as project-engineer. Virgil Miller, A.S.C., Camera Department head, and his staff collaborated on the practical phases of the design. Ben Reynolds, A.S.C., one of the first users of the device, estimates that it can save over an hour per day by eliminating the need of changing heavy blimps from standard to baby tripods, perambulators, and the like, and by speeding up changes of set-up.

DEVELOPING TESTS ON LOCATION

● The problem of making exposure, filter, or other photographic tests on location is greatly simplified by the test-kit shown in the illustration. The outfit consists of a sturdily constructed case, in which are compartments for four one-pint Thermos bottles and two "Leico" "Carrex" developing-tanks. A small tray (not shown) fits in the center of the box, being set directly over the "Carrex" tanks, which rest in specially shaped compartments, and stand on their edges. In this tray is packed a changing-bag, together with any small accessories—such as thermometer, reserve prepared developer, and the like.

In use, the four Thermos bottles contain, respectively, developer, hypo, and water, with the fourth in reserve, to hold additional water, hardener, or whatever may be necessary. The "Carrex" developing reels hold six feet of 35mm film, and are very easy to load in the changing-bags; they will take a full six-foot test, or several shorter lengths, all of which can be developed at one time. If necessary, two thicknesses of film may be developed at once, by placing them in the reel back to back, so, for example, two six-foot tests, or twelve one-foot tests, may be developed at once in each tank.

My own experience has proven that this outfit is a great asset to the cinematographer on location. Any test-strips that are necessary may be developed right on the location, using the exact solutions used in the studio laboratory, and viewed within fifteen minutes after exposing.

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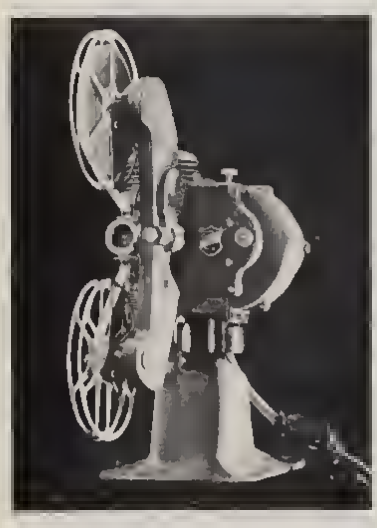

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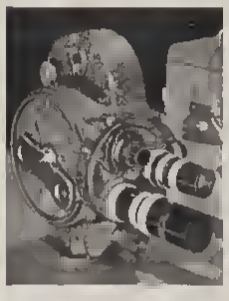
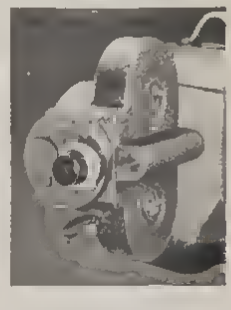


The Filmo 75 Camera—slender, beautiful, and light in weight—makes an excellent family gift. It takes 100 feet of 16 mm. film. Its standard Cooke 20 mm. F 3.5 lens is instantly interchangeable with many others, speed and Kodacolor and telephoto. As finely built as any B&H unit, Filmo 75 is the lowest priced quality 16 mm. movie camera in the world. Price, $59.50, case, $5.50.

The Filmo 70-D is a "professional" among 16 mm. cameras. Has seven film speeds for s-l-o-w movies and *fast*. A turret instantly positions any one of three different lenses. A variable viewfinder gives field areas for lenses of six different focal lengths. A critical focuser is optional. Equipped with one Cooke 1-inch F 3.5 lens, $225, including Sesamee-locked carrying case.



The Filmo 70-E is a "speed" camera, regularly equipped with a Cooke 1-inch F 1.5 lens, which, with Kodacolor filter attached, makes it also a color camera. Further versatility is provided in four film speeds: 8, 16, 24, and 64. The photographic mechanism is identical with that of Filmo 70-D. Price, with F 1.5 lens, $185, with Cooke 1-inch F 3.5 lens, $150. Case included.

Few Christmas gifts give so much pleasure for so long a time (*no Filmo has ever worn out*) for so few dollars. Plan on a Filmo Christmas this year. See these Filmo Cameras at your dealer's or write to us for complete, illustrated literature.

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AMATEUR MOVIES

NOVEMBER,
1934

this issue

Talk on Lenses
Home-Made Trick Titler
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AMATEUR MOVIE SECTION

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PROFESSIONAL Criticism of the Amateur picture is a part of the service offered by the AMERICAN CINEMATOGRAPHER. Many are not aware of this. Hundreds of pictures have been reviewed this past year by members of the American Society of Cinematographers for the Amateur.

Next Month . . .

- William J Grace will contribute another of his illuminating and interesting articles on lenses
- Arthur J Campbell, A S C, will have another article on lighting
- The big news of the month will be the announcement of the prize winners in the AMERICAN CINEMATOGRAPHER 1934 amateur movie contest

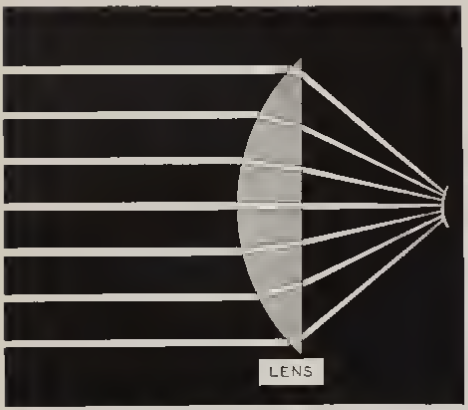

Fig. 2. In a lens not corrected for spherical aberration, light rays through different portions of the lens do not converge to a single point of the image.

Let's Talk

LAST month we became acquainted with a fault of the simple lens known as chromatic aberration, or deviation from true focus caused by different colors of light focusing at different focal planes. We learned also that this fault has been eliminated to a large extent in modern combination lenses thru the use of different kinds of special glass which combined the chromatic aberrations in such a way that, for all practical purposes at least, they cancel themselves and hence focus all colors in the same plane.

Chromatic aberration is, of course, by no means the only fault which must be corrected if the photographic lens (or objective as it is often called) is to image faithfully the details and dimensions of the objects before it.

To name them, other aberrations include spherical aberration, astigmatism, curvature of field, coma, and distortion of shape (i.e. "pincushion" and "barrel"). Before proceeding it might be well to call your attention to the fact that the term aberration refers not only to the result of improper plane of focus, but to true proportional rendition of the image.

Suppose we delve into the effects of spherical aberration and see what causes this aberration. In Figure 2 is shown a simple lens having a spherical surface, the rays of light passing thru the lens not meeting at the same point on the plane of focus (or focal plane). It will be seen that the rays which pass thru the outer portions of the lens do not converge to the same points which pass thru the central portion of the lens. This is because of the fact that a spherical surface does not properly focus all rays of the whole beam due to its shape.

Production lenses of any surface shape other than spherical are difficult to produce, altho some telescope lenses for precision purposes are hand-worked to the shape of a parabola, which does bring all the rays to a true point. There are other ways to reduce spherical aberration, however, than giving the lens the correct shape, and because of the need for keeping the production costs as low as possible, these alternate means are employed in even the best of commercial lenses.

It will be quite apparent that the amount of spherical aberration can be reduced by simply reducing the used portion of the lens with a diaphragm, because the rays are then not allowed to pass thru the outer portions of the lens. Even a very inexpensive lens can often be made to yield acceptable images if it is stopped down enough, but of course this cuts down also on the amount of light passing thru the lens and therefore requires a longer exposure time.

If it were commercially feasible to manufacture lenses having surfaces other than spherical, spherical aberration would not be necessary to correct, for a parabolic surface would automatically eliminate this form of fault. Commercially, however, it is simpler to construct the lens of complementary surfaced lenses which cancel out spherical aberration. Of course, the more elements to a lens combination, the more light loss.

And that brings us to another fault of lenses. This fault is the property of losing slightly the total amount of light delivered to the film. The amount of actual loss caused by the glass itself is so small that it seldom enters into the calculations of the lens designer, unless, of course, the glass has a discernible color. The cause of the loss of light in its passage thru a lens is not due to actual absorption by the glass but by reflections. Every time a ray of light passes from one medium to another, there is a certain amount (about 4%) which is reflected instead of transmitted.

Figure 3 shows how this small portion of light is lost, at least as far as the film is concerned, each time it passes from one element to the next. Since this 4% is lost at each surface, it is evident that, from the standpoint of making the lens as fast as possible, the number of elements should be kept at a minimum. Balsam cement decreases the loss somewhat, but it is affected by temperature and humidity, and is used as little as possible because lenses are made to be used under almost every conceivable condition.

An interesting example of reflection as it affects photographic work is the manner in which, under certain conditions, the shiny surface of the film emulsion reflects light back to the lens to cause film flare. If the last surface of the lens combination (the surface nearest the film) has a curvature of certain dimensions, it is possible that the light which the film reflects back to this surface will be re-reflected by this last surface back to the film. Under some conditions, the re-reflection is focused roughly in spots and causes white spots on the film sometimes called "ghosts." Under certain other conditions, this re-reflected light is rather widely dispersed and weakly covers the whole picture area. This has the effect of making a "weak negative," or one in which the true gradation of tonal values is partially destroyed by this unwanted illumination on the film. In short, the picture is flat, it lacks contrast.

Before we go into the other aberrations of lenses, may we look briefly at one more point illustrated in Figure 3. Notice that reflections take place even in the film itself, this reflection being commonly termed "halation." The brighter portions of the image appear to have a halo around them. This rather disagreeable effect is much less with film than with plates, and with the non-halation backing now made on films of all kinds, both still and movie, this effect is practically eliminated. In your own words, your pictures are sharper, more contrasty, truer to life than were your pictures of a few years ago.

But speaking of aberrations, we seem to be "aberring" a bit ourselves. We started out to discuss lens aberrations,

About Lenses
Spherical Aberration
Reflections
Astigmatism

by
Wm. J. Grace

*Written especially for the AMERICAN CINEMATOGRAPHER, November, 1934, issue
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and become sidetracked on the subject of reflections Let's take up now the rest of the list of lens aberrations, or faults which hinder the rendition of correctly focused images

As we shall presently see, spherical aberration, coma, curvature of field, and barrel and pincushion distortions are really all forms of astigmatism, generally speaking Before we define astigmatism, suppose we examine (and, perhaps, memorize) the following three rules for the perfect optical instrument

1 Every ray of a pencil of light emanating or reflected from a given point of the object must either converge to or diverge from a single point of the image after passing thru the instrument
2 If the object is a plane perpendicular to the axis of the lens, the image of any point of that plane must also lie in a plane perpendicular to the same axis
3 Even tho the dimensions of the image may be different from the dimensions of the object, the proportion must remain the same

Any departure from any of these three rules and the instrument is not perfect, altho we may be satisfied to accept minor faults under certain conditions

One of the translations of the Greek word "stigma" is "point" A stigmatic image is one in which all points of the image correspond to points in the object, it is a true, point-by-point image If the image is formed by an imperfect optical instrument, that image is astigmatic, as is the lens or mirror which produced it (Note Since we are concerned here only with lenses, we shall henceforth use the term "lens," instead of the more general term "optical instrument") If the lens is so made as to agree with the requisites for stigmatism, the lens is a corrected astigmat, or anastigmat Note the peculiar progression of prefixes—stigmatic, **a**stigmatic, **an**astigmatic

Not only as a matter of historical interest, but to note particularly the evolution of the modern lens, may we here review the march of lenses from the simple meniscus lens to the present day anastigmat

Those of us who have been making still pictures for any length of time can remember the stir of enthusiasm which greeted the introduction of the anastigmat lens on a commercial basis Altho the progress in lens design and manufacture preceded by some years the commercial application, the lenses we are going to mention are by no means so old that even the younger of our brotherhood cannot remember that the talking point of this or that new camera was "it has the new rapid rectilinear lens"

The meniscus lens, which was the first lens, was a simple thing of one element After being corrected for chromatic aberration to some extent, it became an achromat Its speed was so slow, however, that the more insistent demands of early photography for faster lenses, lenses capable of gathering in more light, caused the lens makers to place two achromats back to back This combination increased the speed possible without getting into too many other troubles, but not enough—only about 100% increase (from f11 to f8) Two similar achromats were thus combined to increase overall lens speed, and the lens was known as a "rapid rectilinear," or RR lens

The speed of the rapid rectilinear lens was about the only drawback to its use, for its field was flattened properly, and spherical and chromatic aberrations well corrected It is still used in some work in which its slow speed is not a disadvantage, because of its low cost

Continued on Page 332

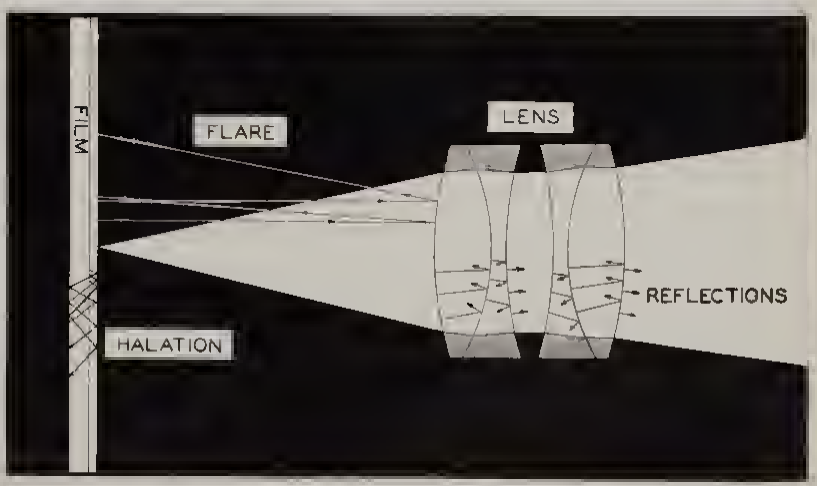
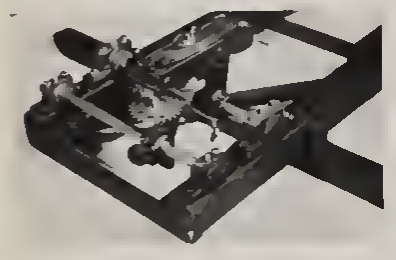


Fig 3 Showing how light is lost by reflection between lens element surfaces. Also, note cause of film flare and halation

A Home



Top picture shows bed of titler constructed of wood . measures 4 ft long by 8 inches wide Feet made to swivel on one side for compactness when stored Bottom picture one view of camera bed, requires little explanation Rods upon which base is supported and upon which it slides laterally, is ¼" shafting Main base support is 4" shaft hanger. . .Rear support made from pillow block

(Continued next page)

IN PREPARING an article of this kind where constructional details are given so that readers may build a similar machine, it must be remembered that individual requirements may vary For instance, some who read this may own a round-bottom camera while others have square-based ones Or the lens axis of your camera may be a different height from the one described herein Obviously, to benefit the most readers, I can only attempt to describe how I built the machine to suit my own particular needs and leave any variations to my reader

As a preliminary let me say that I wanted a titler to match, in tricking ability, my new Cine Kodak Special I had nothing definite in mind at the start other than the fact that whatever I built must not only be capable of various and sundry trick effects, but must also be small and compact enough to keep in an apartment house This meant that elaborate and heavy "basement" installations were definitely out as far as I was concerned The material used would have to be light and yet give a maximum of rigidity and reliability in use Further, it had to be a practical machine and not toy-like Since the new camera was especially adapted for tricks, the titler had to take full advantage of this fact Stop-motion and dissolves, back-winding and double-exposure all had to be taken advantage of—if I were to be satisfied That this machine does all this—and more—I leave to your good judgment

In this article I shall endeavor to cover as fully as possible, the details of construction Application and uses of the titler in action will be given in a succeeding article Suffice to say here that favorite tricks such as wipe offs, chase offs, zooms, retreats, bomb announcements, scroll, twists turns and adaptability to various sizes of field are all within easy scope of the unit Masks may be cut of black or white material to provide for positive or negative filming, and many variations of the afore-mentioned tricks are possible

To begin actual construction you will find the following tools necessary hammer, screw driver, pliers, a jig saw with a fine metal cutting blade, a hand drill and various standard wire-gauge drills, a vise You will have to have a machine shop do the tapping of various parts unless your workshop includes such luxuries

First lay out two of the 1" square wooden strips so that they are 6" apart (inside) Nail a strip of the ½" square wood across the top of each end Follow this with a center piece and then two more between the center and ends, making a total of five cross strips evenly spaced and holding the long 4' pieces absolutely parallel Now, for strength, run some more ½" stripping from one cross strip to its neighbor, crossing from one side of the bed to the other, as in bridge construction Run another strip from this same side of the bed, back to the other side between the next two strips, and so on between each cross strip, in zig-zag fashion The whole should now be rigid (The wire brads are used for the nailing process except where otherwise indicated)

Between the first two cross strips on each end, and on each leg of the bed, running parallel with the latter, nail strips of the ½" wood This side now becomes the bottom of the bed and provides a flat support for the feet which will be added later

Turning the bed right side up so the cross pieces are on the bottom, lay a strip of the ½" wood, running the entire length of the bed, on the bottom cross pieces and against the 1" square strips on each side Nail these two strips firmly in place, taking care that they do not retain any warp in the nailing process (The more accurately you nail this bed, the more accurately will the carriage run)

Now we are ready for an easy, but somewhat tricky, operation Cut two ½" square wooden strips 3' 8" long Nail these even with one end (which hereafter will be the end away from the camera) and in such position that they are resting on top of the 1" square strips for half their width, while the other half projects over the inside of the bed

This done, by looking at the end away from the camera, it may be seen that a groove is thus formed with a ½" face on the bottom, ½" of the 1" square strips for the sides and ¼" of the ½" strips for a top Your bed is now complete except for the legs and the camera mount

The legs of the bed are two pieces of the 1" square wood 20" long, and are mounted in such fashion that they may be "swiveled" or folded away when the machine is not in use Six and one-half inches from one end of each leg drill a hole for a 10-32 screw Seven inches from one end of one side of the bed and the same distance from the other end on the other side of the bed, drill a similar hole Enlarge the hole on the bottom of each foot and the top of each hole in the bed to such a distance that the head and nut of the holding screws will not project Fasten in place with a 10-32 machine screw and nut and cut the screw even with the top of the nut Lock in place by tapping between nut and screw with a pointed punch The legs should swivel

From the piece of 1¼" angle iron, cut two pieces one inch wide Drill two No 27 holes in one side of each piece and (if using flat-headed wood screws) countersink from the inside of the angle Next, drill a similar hole in the center of the remaining side of the angle Fitting these to the free side of the legs is next in order

Made Trick Titler

by **E. Ludes**

Twist the legs until they are at right angles to the bed and hold in place while on angle is screwed to the outside of the 1" bed strip and fastened with wood screws by means of the two holes Screw a round-headed screw through the single hole into the middle of the foot Now remove this single screw, twist the leg so it is not quite under the angle and drive the screw home again, taking care not to twist it any further than it goes when the angle is interposed

The leg should be on the side of the angle toward the far end of the bed Now press the leg against the angle, taking care that the screw head is above the latter, and with a sharp-pointed scribe, mark the width of the screw on the angle Remove the angle itself now, and place in the vise where you proceed to saw a slot indicated by the marks just made and the hole itself This slot is to admit the round-headed wood screw in the leg, without having to remove it each time the leg is folded When slot is sawed and filed smooth, grind or file the top of the angle where the screw first enters the slot so that it may be tapped in place easily

Replace the angles, put the legs in place and tighten the round-headed screw in the leg The feet are now solid, yet may be tapped out of the slot and folded against the bed, making the whole bed go in a narrower space You will find that the screw in the leg gets in the way of the folding process, but a slight pressure downward will cause the "swivel" to give enough to let this screw pass under the bed runners

Now to construct the saddle, or camera mount We'll have to ask your pardon for being a little detailed in the following description, but for the benefit of those with cameras different from mine it will be wise to discuss the "whys" of the construction

First, I built, in oak, an exact replica of the saddle on the Eastman Special Tripod, which, as you know, was designed especially for the Cine Kodak Special Next, mount two ⅜" pillow blocks at the camera end of the bed with the end of the blocks coming flush with the end of the bed, and in the center of each 1" strip For precision's sake, insert the ⅜" rod in these blocks when mounting, and drill fastening holes for 10-32 machine screws all the way through the bed (It will be well to mark the exact position of each block before this so that they may not be interchanged when mounting The holes in these blocks are not centered accurately and this will avoid mounting mistakes.) Before screwing these blocks tight, or before mounting **both** of them mount one end **true the shaft with a square so it is absolutely parallel with the bed!** Then mount and tighten the other one The same process is followed with respect to the ½" pillow blocks and shaft which is mounted in front of these In my case, the centers of the shafts are mounted 2/13-16" apart, but this figure is not necessarily required

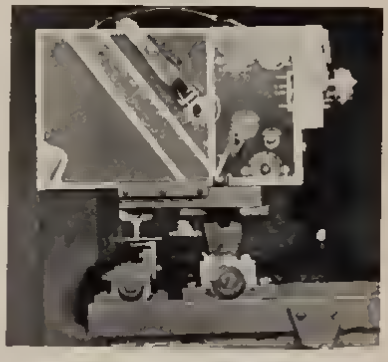
The 2" shaft hanger with 1½" hole is now fastened to the lower side of the camera saddle and the saddle squared **accurately** with the shaft hole In getting the line on mounting the saddle and shaft hanger, extreme care must be taken that accuracy is maintained The hole for the camera-mounting screw is to coincide with the ¼" hole in the shaft hanger, so mount a ¼" piece of rod in this hole while fastening the two

With a hand clamp, or by means of the vise, or both, true the saddle and shaft hole as mentioned before and drill two holes through the wood and shaft-hanger foot with a No 33 drill and repeat on the other foot Remove the saddle and rod, tap the shaft-hanger holes just made with a 6-32 tap and re-drill the holes in the saddle with a No 27 drill Countersink the tap of these holes in the oaken saddle so the screw heads do not project Fasten the assembly together carefully with 6-32 screws Repeat on the other leg—making four screws in all

Rather than go into a long description of the camera-mounting screw here, I leave that to the ingenuity of my readers, with the dry comment that this screw is a ¼-20 thread, and the head may be held away from the foot (for ease of operation) by using washers for spacers

Next, drill and tap the following for set-screws (any size, though the larger, the better) the center of each of the four mounted pillow blocks, the center of an extra ⅜" pillow block and the oil hole of the 2" shaft hanger Insert the ½" shaft (8" long) in the proper blocks and interpose the shaft hanger (upside down—with the saddle on top) Get the shaft even and tighten the set-screws (since this shaft is not to move) Set the ⅜" shaft in position likewise, though it isn't necessary to interpose the other ⅜" pillow block yet—since these split by means of their two screws

Cut another 1"-wide strip from the 1¼" angle iron and (if you want to make it look nice) trim the sides to



An angle from pillow block means for holding the tilting screw . . This made from a gear of a MECCANO set . . with hole in hub tapped to receive the support screw. A hole is drilled in the angle piece, extra length of hub compensated for by washers. . . By turning this gear screw is fed in or out and bed made to tilt.

This shows construction of bed's runway. Bed proper is 1" square wood strips and the guides ½" strips. Wire brads were used for assembling

taper in a sort of V. Drill a hole in one end of one side somewhere near (about ¼" from) the end with a No. 19 drill (for a 10-32 screw). Now, taking the third ⅜" pillow block, hold it in your hand so that the camera side of the bed at your right, the block hole parallel with the shaft, the base of the block is pointing toward the end away from the camera. With the block in this position remove the **top** screw (holding the two pieces together) and cut this screw off at such a length that it just enters and holds firmly in the bottom, tapped portion of the block. Replace. Mount the angle you have just cut and drilled, to the base of this block with a short 10-32 machine screw that will fit in the tapped portion of the block not used by the screw you have just cut. The angle is in such position that the top edge points **away from** the bed. Tighten this screw so that the top flat part of the angle is **parallel to the shaft.** Now, by means of the regular mounting hole in the pillow block, start a hole the size of the one in the block—drill into the angle just enough to mark it, and finish with a drill of the proper size for tapping the angle. (If a 10-32 screw fits the pillow block base hole top with a No. 19 drill—if 8-32 is the size, use a No. 28 drill.) A second screw is thus mounted to hold the angle rigid.

My tilting-screw arrangement was made with a gear from a Meccano set. This gear has a hub about ¼" in diameter and a hole that could be tapped for an 8-32 screw. So, in the top part of the angle iron thus mounted to the small pillow block, I drilled a ¼" hole as near the far edge as possible, inserted the hub of the gear (using the necessary washers to almost make the hub flush with the bottom of the angle), then hammered the sides of the hub over the hole (use a washer between the end of the hub and the angle) so the gear could turn, but not become loose. The hole in the hub was tapped properly and the block mounted on the ⅜" shaft with the base toward the opposite end of the bed. A **thumb screw** was put in the previously tapped oil hole (two part of block between two screws) and by tightening this, the block could be held rigid.

Cut the head from a long 8-32 screw, hammer one end flat and with sides as parallel as you can get them, mount this to the under-rear side of the saddle block by means of some small (scrap) metal angles and drilling a hole through the flat portion and the angles themselves, a pivot is riveted in place and allows this screw to swing in a slight arc parallel to the bed. This screw is placed in the threaded hole of the gear and the gear turned to bring the saddle down level.

Install a thumb screw in the tapped portion of the 2" shaft hanger and the camera mount is complete. To adjust, simply loosen the thumb screw on the shaft hanger and the pillow block—slide the assembly until the camera lens is centered where desired—turn the gear-tilting screw until the lens axis is parallel to the holding board on the carriage (to be described) and tighten the thumb screws.

TITLE-HOLDING BOARD

Next comes the construction of the first important unit of the titler, namely the **holding board** (so named, because it holds the titles and masks).

Cut two pieces of the ½" square wooden strips 16" long. Place these in position in the groove of the bed. Cut a piece of the 1" square stock slightly under 6" long and, with the jig saw, cut the ends ¼" in and to a depth of ½". This acts as a spacer for the "carriage" of the holder. Fasten (with brads cut to about ¾" length) to one end of the two strips, taking care that the strips are not pressed so tightly in their grooves that they will not slide, yet not so loose as to cause them to wobble.

Cut another spacer from the 1" stock to the same length, but do not cut out the ends. This is nailed to the strips about 3" in from the opposite end (with 1" brads). The unit thus formed should slide from one end of the bed to the other. On the spacer last mentioned (the one which will project above the level of the bed) mount a 1" square wooden strip 14½" long, and absolutely parallel to the bed. This is for mounting the holder.

Title holder proper is made of thin veneer cut-out dimensions are 12x9. Small base made of ½" wood strips .. and separated by blocks of wood which secure holder and the block which supports "wipe-off" mechanism

Between the spacers just installed comes the "locking" device. This consists of a strip of ¼" veneer about 1¼" wide nailed to the carriage strips. Another piece of the same material, but 6¾" long is cut. Drill a hole in the exact center of these two strips and insert a 6-32 or 8-32 machine screw from the bottom. Next, holding the two strips parallel, drill a hole to each side of this center hole and near the carriage strips. Remove the long top piece. Drill the two outside holes of the bottom piece and the center hole of the long top piece with a drill several sizes larger than necessary for the screws to be used. In the short piece, insert a 1" machine screw and fasten it in place with a nut on top. In the long piece, fasten **two** machine screws in the two outside holes with the heads on top and the nuts on the bottom. Tighten these screws so they are rigid. Cut two short pieces of fairly weak spring—slip them over the two outside screws and put the long top piece in place over the piece fastened to the carriage runners. The outside screws moving in the enlarged holes in the bottom piece and the center screw projecting above the enlarged hole in the top piece. A thumb screw is placed on the central up-projecting machine screw and, when tightened, serves to compress the springs and "pinch" the upper runners of the groove, thus "locking" the carriage. When slightly loosened, the springs lift the top piece, and the carriage runs free.

The title-holding board is next in line. Take the piece of 14½"x11"x¼" seasoned veneer and lay it out square

on the edges—that is, check and square its outside lines Run a line through the middle of the 14½" length Run another line parallel to its greatest length and 1" down from one edge (to be the top edge) Five and one-half inches from the edge near the 1" parallel line and down the middle of the board is the exact center With the points thus laid out as reference, mark out a piece the shape of the film and having a height of 9" and a width of 12" Using the jig saw, start cutting this inside piece out Be sure to use as small a hole as possible in starting the saw, since the inside piece is to be used When the inside is removed, trim the edges with sandpaper (or a file) Do the same to the outside edges of the piece thus removed

Mount this piece of veneer to the 1" square strip that is 14½" long by fastening it to the front face with brads Caution must be taken not to tilt the board in mounting Now cut some brass channel strips 10" long Four of these are for the two sides of the board (front and back) I happened to have some scrap ¼" angle brass on hand and by cutting small pieces of this I soldered them to the brass channels in such fashion that they held the channels in position by drilling holes and mounting the angles as feet These channels should be as far apart as possible to mount them in order to allow strength to the masks that they are to hold One other channel strip is cut to fit between the front side channels and to be mounted 1¼" below the inside bottom mark of the cut-out portion This channel holds the **front masks** (the rear simply resting on the 1" square mounting piece) The reason for mounting this strip so low is to avoid errors in fitting masks Once a mask is correctly cut, it should always be inserted in the channels the same way, and this provides a greater width at the bottom than at the top, which is only 1" wide

The board is braced by running a small piece of rod, angle brass, or similar metal from the back side of the 1" square wooden mount, where it may be screwed in place to

Shows outfit in position without a title. . . . Camera is stationary, holder moves to or from camera, yet may be locked in position at any point depending upon size of title or subject to be photographed

the back side of the holding board, where it may be soldered to the rear brass channel Caution is advised in mounting channels to get them straight and the same width and position in front and back, for sometimes it is desirable to mount a certain mask **behind** the holding board, instead of in front, and this caution will prevent misalignment

TWIST DEVICE

With the apparatus as it stands, the first tricks may be made Zooms, bombs, retreats and stop-motion as well as dissolves, etc But we are not through by any means Next, we'll use that piece that we cut out of the center of the holding board Mark off the exact center of its length, and draw a line from edge to edge Mount a piece of small angle brass so that the top edge, where the line centers, will have a metal plate Do this to both edges of the board and fasten the brass angles firmly with small machine screws Then drill a hole in the exact middle of the thickness of the board, and coinciding with the center of its length, with a No 27 drill The hole may be drilled to a depth of from ½" to 1" **Do this to the top edge only!** The bottom edge has its brass angle drilled and **tapped** for a 6-32 machine screw which is inserted, tightened, and the screw cut off so that only ¼" projects Trim the cut end smooth Getting back to the treatment of the top hole After the hole is drilled in this plate and board, drill a smaller hole and tap for a 4-36 machine screw, in the side of the brass angle, and so that a rod inserted in the hole in the top may be fastened with the 4-36 screw in the side (This screw should be just long enough to catch and hold the rod—no more)

Drill a hole in the top of the holding board to coincide with the hole in the top of the insert This will run through the 1" width of the top Drill a similar hole to a depth of about ⅜" in the bottom to coincide with the projecting screw there (Another metal plate was mounted in this bottom hole of the *holding board for strength*) To mount, place the projecting screw of the "insert" in the hole in the inside bottom of the cut-out portion of the holding board, hold insert in flat position and run a No 6 unthreaded rod thru the hole in the top and into the hole in the insert The board will now hold itself, but will "spin" or "twist" Mark a point about ¼" above the assembly and, removing the rod, bend it into the form of a handle, trim and finish it off Replace it, remove the 4-36 screw in the insert and **start** a hole in the rod at that point, taking care that the handle of the rod is parallel to the board Now replace the screw, tighten and the handle is rigid

Toward the outer edge (right side) of the holding board, drill another hole through the 1" wide portion of the top Be sure that the hole will come at least ½" in from the side of the cut-out Into this, drop a machine screw that has had a dry-cell battery nut screwed up to the head (for a knob) and which will project for about ¼". Lay the "insert" against this screw so that it is nearly flat with the board—mark where the screw comes, and with a knife cut a depression for the screw so the insert will lay flat and parallel to the holding board Lift the screw, twist the insert half way around and repeat the operation The insert should be in front of the screw when making and cutting

In use, a title, photo, or other subject is mounted to the board with thumb tacks, Scotch tape, etc, and the succeeding title mounted on the back of the insert The first title is exposed, and while the camera is running, the loose screw is lifted, the insert swung slowly past it, the screw dropped in place, the insert continuing around until the back is now in front and the other side comes in contact with the screw, at which time the insert is parallel with the board again Further use of this device will be described in a succeeding chapter

Continued on Page 328

This shows background in place for shooting on reversal film. . . Black edge is piece of veneer cut to fit in brass channel with center cut to film proportions

Filming the Family Physician

by
Arthur J. Campbell, A. S. C.

YOU will not need ony special props or make-up for this little bockyord movie It will toke obout 200 feet of film

The few things needed con be found in ony house where there are children Tell your requirements to them, they will dig up all the props you need This continuity has the odvontoge thot proctically everyone in the fomily con take part, so that in oddition to hoving on interesting screen ploy you olso hove o record of the entire fomily

It isn't necessory to follow this script shot-for-shot if conditions or surroundings will not permit You'll find it fun to adopt it to your locations ond conditions It is the intention of these continuities to guide you, but here's the story

Scene 1 Long shot of Moryjane contentedly ploying with her Doll outside the fomily garage in the bockyord

Scene 2 Medium shot or same, Moryjone props her big doll agoinst the open door of the gorage ond then

Scene 3 Close up of Moryjone speoking
Title "Now you woit here like the good doll you are I am going to get some candy for us"

Scene 4 Same os 3 Moryjane woves goodbye to her doll and walks out of frame

Scene 5 Long shot of front of house with drivewoy to garoge A cor comes up, the hond of the driver waves to Mo ond Moryjane standing in front of the house It is father coming home The cor enters the drivewoy

Scene 6 Long shot of car entering garoge, running over the Doll

Scene 7 Close shot of car wheels running over Doll

Scene 8 Long shot of Dad leoving the goroge, not noticing the doll on the ground, he wolks out of frame

Scene 9 Medium shot of Dad greeting Mother ond Moryjone, he speaks—
Title "I have put the cor in the garoge"

Scene 10 Some as 9 Moryjone gets up excitedly and runs out of frame

Scene 11 Long shot of Moryjone running towords the goroge door and then seeing her doll on the ground She picks it up

Scene 12 Close shot of Moryjone with her Doll, she is crying Her Dolly's leg comes off

Scene 13 Same os 11 Mo and Po, attracted by the the cries of Moryjone, come to console her

Scene 14 Close shot of Junior peeping over o fence, he too wos attracted by Moryjone's crying

Scene 15 Medium shot of Junior backing away from the fence, a pol is with him They conspire, and then (ponning with them) they enter a tool shed
We fode into

Scene 16 Some os 13 Mo ond Po ore still consoling Moryjane, who hugs her broken doll, when oll of a sudden they all look towards the right
Title "Look whot's coming here!"

Scene 17 Some as 16 The boys with their kiddy car drive up They hove a flog with o red cross on it They corry bags ond in belts around their woists they carry all sorts of hommers ond clippers saws, etc (This shot con be mode very funny)

Junior has an old bowler hot ond glasses, he is the doctor, while his buddy is supposed to be the ambulance driver Mo and Po connot help laughing ot their get-up Even Moryjone smiles under her tears as Junior opprooches them

Scene 18 Medium shot of group Junior comes close to Moryjone ond points to the Doll
Title "Somebody colled the ambulance, saying thot your Baby had on accident, we hove come to cure her"

Scenes 19, 20, 21 Short successive close ups of Po loughing, Mo smiling, and Moryjane cheerful ogain

Scene 22 Same os 17 The boys get busy, they grob o bench Junior tokes o towel from o clothes lines ond prepares the operotion table He lays the Doll on the bench ond covers it with another towel, just leaving the Doll's face free Everybody watches amusedly Drawing o choir next to the bench the boys unpock their tools And what on assortment! With more towels they dress up as surgeons and get to work Junior tokes something out of the bog ond holds it to the Doll's nose

Scene 23 Close up of Junior's hands holding o package that hos LIMBURGER CHEESE printed on it, to the Doll's nose

Scene 24 Close up of Buddy tying his hondkerchief over his mouth like o surgeon

Continued on Poge 332

An Amateur Makes Undersea Movies

by

William Stull, A. S. C.

MAKING movies fifty feet beneath the surface of the Pacific!

This was the way Norman Foster recently spent a three months' vacation in the South Seas. Not only did he spend his time filming the scenic and other beauties of the islands of Tahiti, Moorea, Bora-Bora, and the rest of the group, but he made a diving-suit for his camera, and filmed the Polynesian pearl-divers at their work below the surface of the sea.

"It was a great experience," he says, "but a mighty strenuous way to spend a vacation. My equipment consisted of the old Eyemo that had filmed my 'round-the-world pictures five years ago, a brand-new Eyemo, with turret-head, 200-ft magazines and an electric motor, and the diving-box I had built to fit the older camera. Before I left Hollywood, George Barnes, A.S.C., had helped me to get a good assortment of filters, and while I was in Papeete, Max DuPont, A.S.C., and Victor Milner, A.S.C., gave invaluable advice and assistance.

"My underwater camera-box was as simple as possible, anything used under water has got to be reduced to its simplest terms, for pressure, currents, and a dozen other factors complicate things tremendously. The underwater box was just that—a sturdy wooden box, just big enough to hold the camera. It was made so that it was unnecessary to screw the camera in place: padded wooden blocks, shaped to fit the contours of the camera, held it accurately in place. It was a very tight fit, for sometimes when, after a long dive, some moisture had leaked into the box, it was difficult to get the camera out. The front of the box carried two Optical Glass windows, one for the lens of the camera, the other for the finder, while a single window behind enabled me to look through the finder. A simple lever and shaft extended the trigger through a water-tight joint, to the outside. The front-plate was also the door through which we removed the camera; it was held in place by brass bolts and wing-nuts, and we did our best to make the joint water-tight with rubber gaskets. Unfortunately, no matter how tightly we bolted the cover down (even using pliers and all possible 'elbow-grease') some water would usually manage to leak in if we went down very deep. However, the supports for the camera raised it three or four inches from the bottom, so that with care we managed to keep the camera reasonably dry.

"Around the outside of the box I put a band of stout webbing—the same sort you use on a trunk, but stronger. This band I used as a handle, both for supporting the camera under water, and for panning and tilting when necessary. (Actually, it was more useful as a grip to prevent the currents from panning for me!) Underneath the box, and attached to the web, were heavy lead weights which extended several feet below the box. On the surface, the outfit weighed about 350 lbs., but when I got it down twenty feet or so, the box was actually buoyant. The weights, hanging underneath, counterbalanced the box and proved even more satisfactory than a tripod, while the resistance of the water kept me from panning or tilting too fast.

"Here's how I worked. Of course I had planned out the action of my scene well beforehand, and explained it to

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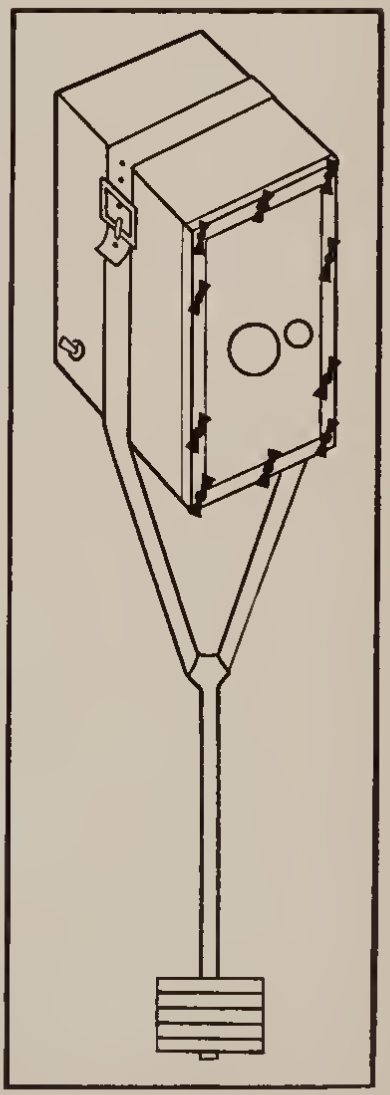
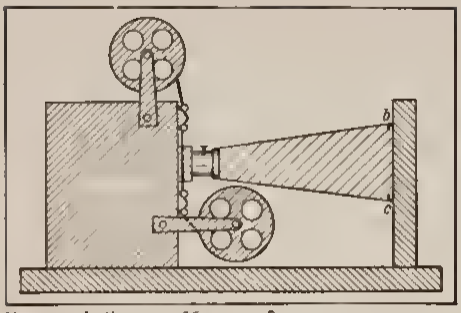
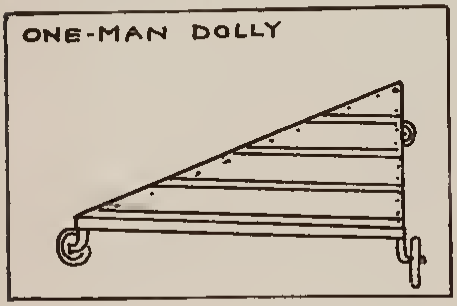


This sketch is described during the course of the accompanying article. It is the contrivance used by Mr. Foster to make water pictures.



Above, projecting your 16 mm or 8 mm on your titler to make still pictures.



Practical Suggestions for Cinephotographers

by
Karl Hale

THE home-made projector-enlarger may be the answer to a problem that has troubled many a progressive Cinephotographer

The desire to have a photographic enlargement of a particularly well-composed and photographically correct shot is common with all of us There are several commercially manufactured appliances on the market that will do this for you, however, many like to build their own devices and brag to their friends "I built that myself"

In case you use negative film it is very simple all you have to do is run your negative through your projector, and mark with a piece of tape the particular frame you would like enlarged

Then use your titler, with the only difference that the projector takes the place of the camera Find out how close you can focus an image on a piece of plain paper in the titler With some of the current model projectors you will find it impossible to focus an image say, 4x5 inches However, we have a practical solution to overcome this obstacle We all are familiar with the Eastman Portrait lens attachment that slips over the lens, this attachment will do the trick for us

If you run a negative all you have to do is put a piece of bromide enlargement paper in place of the title on the titler Then make your print the same way you would an ordinary enlargement Develop and finish in the usual manner. Of course, this process has to take place in a darkroom with a regulation orange or ruby light

The process does not differ much for reversible film Instead of the enlargement paper a photographic plate or film is inserted

Owing to the fact that there are so many makes on the market no special plate or film is mentioned They all will do the trick A test or two may be necessary, but the ultimate result will amply recompense for your extra efforts

You will have to do all this in the darkroom, especially when making the new negative. Do your focusing as suggested on paper and then when completely dark insert your plate, make your exposure by switching the light on and off in your projector

A special fine-grain developer used for miniature camera negatives is recommended for this process Once you have your negative finished it is easy to have as many prints as you wish

In this manner you will obtain a complete photographic record of the most interesting angles and highlights of your pictures For those that can afford to buy a ready-made attachment so much the better, however, they will miss the joy the real amateur experiences when he can produce lovely photographs from his film with an entirely home-made contraption

One-Man Dolly

The average Cinephotographer has a very limited choice of camera assistants A truck- or dolly-shot usually requires a trained crew to push it This may be one of the main reasons why the average cinephotographer hesitates to make dolly-shots The accompanying sketch offers a solution to those that wish to make a clean dolly-shot

This little home-made dolly will do the trick for you It has one great outstanding advantage The man who operates the camera can operate the dolly as well It is a sort of three-wheeled kiddy-car affair It must be solid enough to support the camera and half of the weight of the operator Mount your camera on it and then with one foot on the dolly and the other on the ground you will find it very easy to guide the dolly and still have your hands free to work the camera

I would not guarantee success at the first try but a few tests with an empty camera will soon convince you of the value of this little dolly

The dolly is easy and cheap to build and a child can operate it Ordinary furniture rollers will do nicely, although standard kiddy-car wheels will do as well but you have to construct the dolly according to the type of wheels you are going to use

Needless to mention all wheels must be free to turn in all directions

Dolly-shots made with this dolly and a universal-focus lens are easy to make and very effective on the screen A little measuring will help First find out how close you

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Hints on Indoor Cinephotography

by

Arthur J. Campbell, A. S. C.

IN PART I of the "Hints on Indoor Shooting" I tried to outline some of the fundamental rules that govern indoor photography A recent survey among amateur cinephotographers revealed that even the most advanced amateur shrinks from shooting with artificial light It is my purpose in these articles to try to dispel this light bugaboo, and give you a working basis upon which you can, with confidence, make indoor movies with artificial lights

Of course, the making of indoor movies requires an additional outlay for lighting equipment However, you will be more than repaid by the advantages this equipment will give you From now on you will be able to obtain a regularity of exposure.

Evidently there must be some minimum requirement in the amount of light needed in indoor shots The easiest and cheapest way in the long run to find this minimum for your particular camera and lenses is to make a short test film

Here is a test that should be adequate for any camera on the market Presuming you are using film of a speed comparable to Eastman or Agfa Panchromatic, set your lens opening at f 3 5 Now place the subject, a patient person, against a neutral color background Always use a neutral color like cream because dark draperies or walls drink in or absorb light to a great extent

The first part of the test will be a close-up Set the camera up about 6 feet away from the subject with the lens about eye-level, in order to make a straight-on shot Next, following closely Sketch No 1, found in last month's article, space your lights Lamp 1 is usually placed on the subject's right, about 5 feet away, and lamp 2 on the left about 3 feet The object of placing the lights as shown in the diagram is to assure modeling in the face, that is, that it may on the film not be flat, showing only length and breadth, but will give the realism of the third dimension, depth After focusing and checking to see that there are no reflections or kickbacks, as the professionals call them, in your lens you are ready to shoot the scene At normal speed, 16 frames a second, take about 5 feet of the subject.

Remember that this set No 1 will always give you sufficient exposure for a normal close-up, from it you can build to obtain artistic and dramatic effect when needed.

After making notes on paper of our procedure in Test 1, we move on to Test 2, which is a medium-shot A medium-shot is usually one that takes in the subject from slightly above the knees to the top of the head

Using the ordinary 1-inch lens, your camera is now set up about 10 feet from the subject This necessitates a movement of your lights in order that they may not be seen in the scene The closest is now about 5 feet from the subject, this automatically calls for re-enforcements of more lights Place another photoflood next to lamp 1 on the right, and do the same on the left Of course, if this were anything other than an exposure test, these set-ups would require back-lighting and set-lighting In this article we are working only on the exposure for the subject, in a later article a full discussion will be devoted to background and back-lighting.

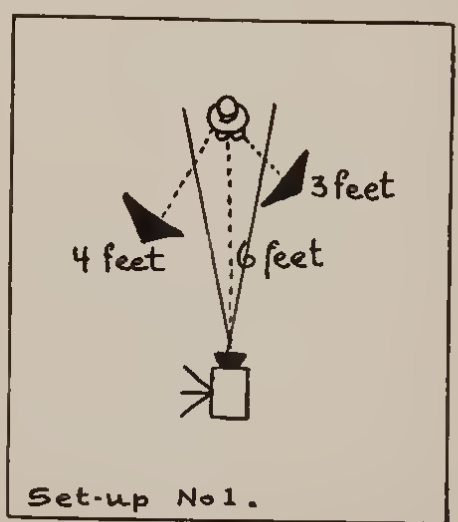
Now let us make ready for Test 2, in this test the subject may move around a bit, but not too close to the lights on either side, as the increase of light on one side will upset the photographic balance of the scene After finishing this test, make your notes on paper of procedure with diagram and distances of light set-ups

Test No. 3 is a long-shot of as many people as easily fit in the available space This means that first you go back as far as possible with the camera, checking, of course, your sidelines, that enough room remain to place the lights

In indoor shooting, when the subject is more than 6 feet from the camera, an increase of light is essential A safe and practical formula has been found through experience The formula is that for each unit of 3 feet that the distance of the subject from the camera exceeds 6 feet, add 2 lights, one on each side of the subject

Following this formula after having made the necessary measurements and placing of lights, make your third test

After receiving your processed film and noting the results—if over-exposed or under-exposed—you will, upon checking with your notes, know whether to use more lights or to move them further from subject From this knowledge, with little trouble, you can make a chart of indoor scenes with lights necessary and distances for placing lights as suitable to your particular camera These tests should prove to you clearly that, properly placed, a few lights will give excellent results



Set-up No 1.

WHEELS OF INDUSTRY

Splicer for 8mm and Sound Films

● Bell & Howell announces a new splicer that handles all sub-standard motion picture film—16mm silent, 16mm sound and 8mm

This splicer, which is called the B & H Triple-Purpose Splicer, is easy to operate

A major feature is the arrangement for convenient application of the cement without the bother of lifting the non-scraped film end Cement is applied merely to the upper film surface Then a touch of the new automatic film shifter quickly flips the films to correct splicing position as the clamp is closed

The pilot pins are retractile, allowing instant and easy removal of the film without possibility of injury to the perforations

New Theatre Projector

● A new theatre sound projector, adopted to the large school auditoriums, is announced by Herman A DeVry, Inc

This projector incorporates the silent chain drive and has the rear barrel shutter as regular equipment It is claimed this shutter gives more light on each picture frame and cools the film aperture at the same time

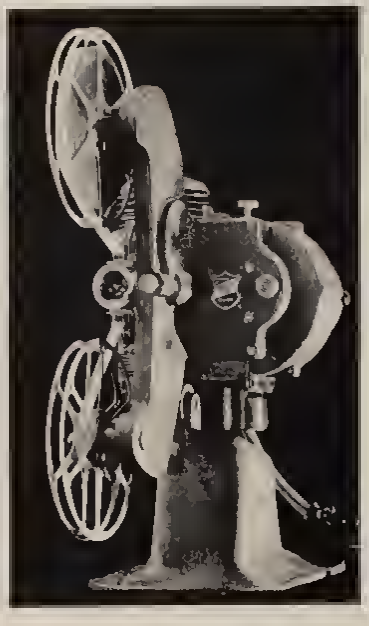
A new framing principle is claimed The intermittent is placed vertically below the aperture and so connected that in framing, it is always synchronized with the timing of the shutter The Robertson Centripetal wheel for absorbing vibration is used

This projector uses arc or mazda lamps, A C or D C The larger model projectors have solid bases, and the semi-portable adjustable legs for easy transportation

1000-Watt 16mm Projector

● According to an announcement from Bell & Howell company that corporation will shortly market a 1000-watt projector especially designed for use in larger auditoriums It is claimed that this projector gives an 80% greater screen brilliance than the 750-watt projector and does it with only 33 1/3% lamp wattage increase

This projector which will be known as Filmo Model 130 will have a capacity of 1600 feet of film



New Eastman Projector

● Eastman s latest presentation to the amateur movie field is the new Kodascope L Outwardly Kodascope L appears to be merely the Adonis of the projector family but it has much more than appearance, for Kodascope L actually embodies a new idea in 16mm movie projection

This projector is designed for use with any of four lenses and three lamps These lenses are of one, two, three and four inches in focal-length, affording high optical efficiency for every reasonable variation in projection conditions With any of these lenses a 400-watt, 500-watt or a 750-watt lamp may be used

Thus, with Kodascope L, twelve high-efficiency combinations of lenses and lamps are possible The various lenses and lamps permit projection as close as nine feet or as far as forty feet with the screen image ranging from 30x41 inches up to 43x60 inches

Lens-Lamp Combinations for Kodascope L

This tabulation provides a definite basis for choosing lens-lamp combinations for Kodascope L The figures given are for technically perfect quality, with properly balanced screen brilliance (12-foot candles) However, very much longer throws and larger screen pictures are possible Kodacolor can be used with the one- and two-inch lenses without additional optical equipment

Wattage	Throw	Screen Image
THE 1-INCH, f 2 LENS		
400	9 ft	30"x41"
500	10 ft	33"x46"
750	11 5 ft	38"x53"
THE 2-INCH, f 1 6 LENS.		
400	20 ft	32"x45"
500	22 ft	36"x50"
750	26 ft	43"x60"
THE 3-INCH, f 2 LENS		
400	29 ft	31"x43"
500	31 ft	34"x47"
750	36 ft	40"x55"
THE 4-INCH, f 2 5 LENS		
400	32 ft	26"x36"
500	35 ft	29"x40"
750	40 ft	33"x46"

Miniature Enlarger

● The Kodak Miniature Enlarger, designed for the purpose its name indicates, is currently announced by the Eastman Kodak Company

The new enlarger gives enlargements up to 11 by 14 inches from negatives of the half Vest Pocket size (1-3/16 by 1-9/16 inches) It enlarges from 2½ to 10 diameters, and takes negative areas up to 2¼ by 2½ inches

The Kodak Miniature Enlarger is one of few enlargers that permit a wide range of small-sized negatives to be used, even including the popular snapshot size of 2¼ by 3¼, provided the length is masked down to 2½ inches

Critical focus is obtained by turning the lens mount in which a Kodak Anastigmat f4 5 lens, especially designed for enlarging, is set The lens is permanently installed

Rheostat control gives two degrees of illumination from an inexpensive Mazda Photoflood Lamp Dimmed, the light is about one-fifth the full power This two-degree illumination provides a sufficient variation in light strength, making

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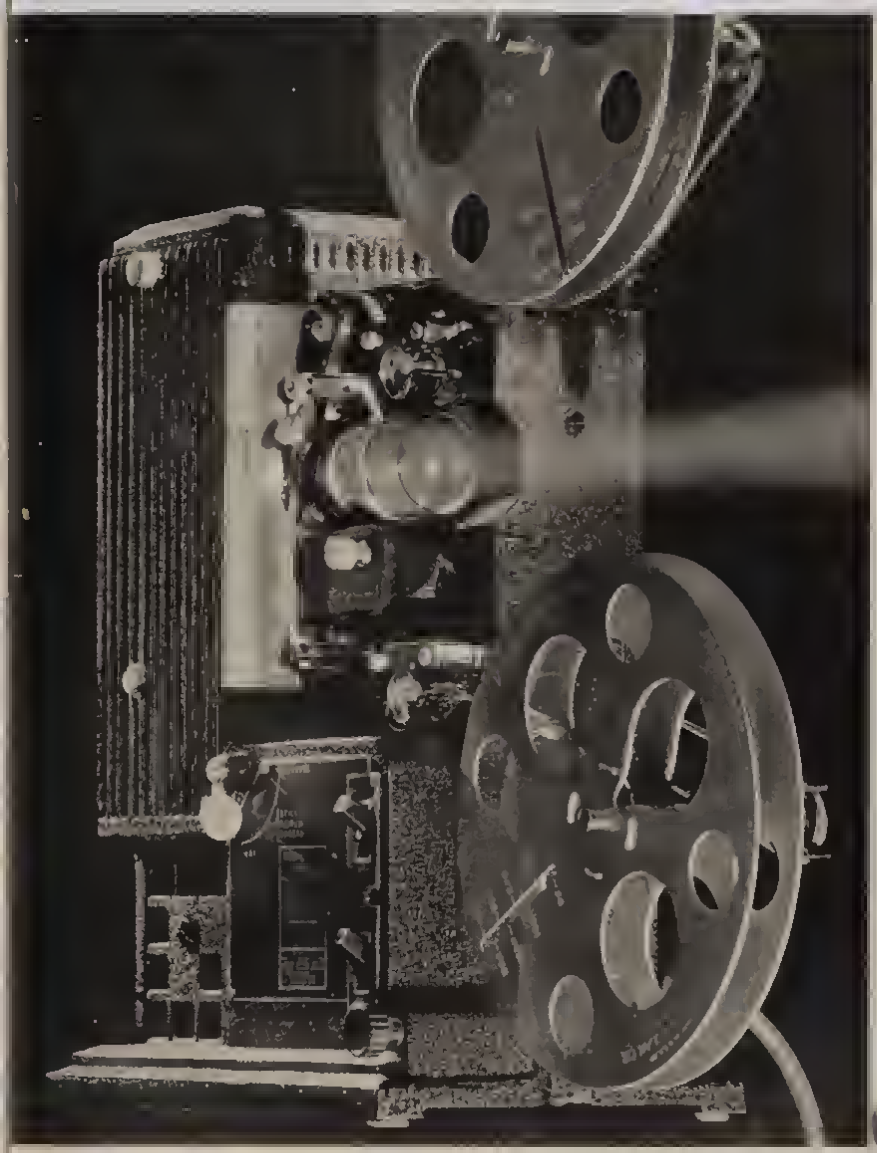

Introducing TAILOR-MADE Projection *with the* NEW Kodascope "L"

WITH *f*.1.6 lens and 750-watt lamp, the "L" supplies unequaled screen illumination.

But maximum brilliancy is of no great advantage unless you need it. Hence, projection tador-made to operating conditions—a new idea that assures ideal screen results whether you show movies in a small library, large living room, a classroom, hall, or auditorium. Four lenses, three lamps—from which you can arrive at a lens-lamp combination that will produce better movies for your individual needs than you've ever before enjoyed.

With the 2-inch lens and 500- or 750-watt lamp, Kodascope L shows Kodacolor at its best and brightest. Supplementing the Model K, and retaining all of its many advantages, the "L" is priced at but $165—with lens and lamp, from $184. Ask your Ciné-Kodak dealer to show you this outstanding 16 mm. projector.

The lenses: 1-*inch f*.2 — *for use in close quarters,* 2-*inch f*.1.6—*for average showings,* 3-*inch f*.2 *and* 4-*inch f*.2.5—*for longer "throws"; the lamps:* 400-, 500-, *and* 750-*watt—from which you choose the combination that's exactly right for the conditions under which you show your movies.*

Eastman Kodak Company. *Rochester, N. Y.*

A HOME MADE TRICK TITLER

Continued from Page 321

THE WIPE-OFF

This mechanism is a bit more tricky and complicated than it seems, yet it is not so complex as to prevent the amateur builder from attempting its addition to the titler. In principle, it is a simple lead screw with a traveling device that holds cards and travels across the face of the holder between the latter and the camera lens.

The base of the wipe-off is a piece of pine 1" thick, 3" wide and 15½" long. The center is lined with the center of the bed and the upper groove strips indicated, or marked off, on the base. Saw a slot for each strip a little wider and ~~deeper than ½"~~ so that the base will rest upon the holder-carriage runners. Nail carefully to these runners **from the bottom.** (The 1" brads will not reach through from the top and if larger nails are used the strips may split.) I should mention that the position of the base is in front of the holder, next to and touching, the end spacer. This brings the distance from holder to near side of base approximately 7¼".

In the middle of the base at the extreme ends, mount the two remaining ½" pillow blocks, taking care to tighten them only with a ½" rod in their shaft holes. These will support the lead screw. Any machine shop can furnish such a screw cut from ½" shafting and to any thread desired (which allows the wipe to move 1" in as many revolutions of the shaft as there are threads per inch). In my own case a pipe die was convenient so it was used. This has a bite of 13½ threads per inch. The remaining ⅜" pillow block is now tapped to match the threads on the lead screw and mounted on the screw by taking the ½" pillow blocks apart (be sure to keep these pieces on their respective bases and facing the same way). Drill and tap a hole (any size convenient) in the end of the lead screw that is tapped. The smooth end is mounted on the right hand side of the base looking at the holder from the camera end. Into this hole just tapped (on the left side in above position) is fastened a machine screw which holds a large washer, which in turn, holds a felt washer. The felt provides a cushion between the metal washer and the pillow block face, and prevents the lead screw from becoming too tight.

Mount a sprocket wheel on the other end (right side) of the lead screw, where the screw has no thread. Put several washers between the gear and the pillow block face and fasten firmly, but not too tightly to the lead screw by means of the set screw in the hub, or, if it hasn't one, drill a hole through hub and shaft and fasten with a rivet.

The remaining 5" piece of ½" shafting is drilled with two holes parallel to each other and ½" from one end and 2" from the other. Hold this shaft, by hand, in position in the middle of the base and extending out the same distance as the lead screw. Slip the other sprocket in place—cut the ladder chain to the nearest correct fit and fasten it together in a loop. Run this chain over both gears, then tighten by dropping the idler shaft (with its corresponding gear). If the shaft drops too far to be fastened, take out one link of chain and try again. When the correct fit of chain is ascertained, fasten the idler shaft with two wood screws. There is no need to describe methods of installing a crank handle on the idler gear, beyond mentioning that this gear is necessary to get the handle out of the way of the wipe cards, and therefore take care to keep the handle small enough to miss the wipes when they are on the right hand side of the unit. The idler gear was fastened in place by topping the end of the idler shaft for an 8-32 machine screw and using washers to align the gear. The handle is raised away from this screw by means of washers acting as spacers to hold it away from the chain, etc.

You will find, if you have gone this far, that the traveling block on the lead screw wobbles. This is overcome by any one of several methods. The one I used consisted of cutting a piece of metal (of a thickness to **almost** keep it from wobbling when inserted between the traveling block and the base) and bending it in a slight arc and soldering it to the bottom of the traveling block with the arc turned **down** against the base. Cut two small pieces of angle brass (1½" long will do) and solder these to the metal arc so that they slide along the top and sides of the base. All wobble is removed by treating this way.

Now cut a piece of metal about ½" wide by ⅛" thick and about 2" long. Drill two holes in it the same size and distance apart as the screws holding the traveling block together—starting from one end. The strip is to fit under these screws and extend toward the holder for a short distance, then it is **bent** downward. This bend should just be far enough from the block to admit a screw head between the back of the down part of the angle and the block itself.

Take the 12" piece of ⅜" angle brass and cut it off seven inches from the end. The seven-inch part is to mount on the angle strip just finished, and the five-inch part to fit **inside** the seven-inch piece. Mark off the center of the seven-inch piece. Drill a hole in one side of this in the center. (The proper side will be to hold the angle as though it were a seat and you were going to sit down and look at the holder. Now drill the back side in the center and you'll be right.) Holding the angle in the above described position, with its back against the small angle strip on the traveling block, get the top of the angle level with the top of the strip on the black and mark the hole already drilled in the brass angle so that a similar hole may be drilled in the traveling block angle. In the latter, drill and tap a hole for a 6-32 machine screw. Mount the screw (one about an inch long) from the back of the T B. angle and tighten it. Replace the T B angle and tighten. Slip the brass angle in position and carefully level it off so that it is parallel with the base and the holder and **solder** it to the T B. angle. (Note—use solder on the back side—where the two come in contact, only. The front must be smooth.)

Next, find the center of the 5" piece of brass angle in the same manner and drill a hole slightly lower, or closer to the "point" of the angle, to compensate for the offset of fitting this inside the longer piece. This hole may be of a greater diameter than the screw it is to take. Slip the short piece on top and in front of the longer piece, letting the 1" 6-32 machine screw project through the hole and find some kind of a spacer with a hole the size of the screw and an outside diameter of not more than ¼", altogether, about ½" long. (An old spacer out of a radio set was just the thing.) A 6-32 battery cap makes the thumb screw that finishes this mechanism.

In use, the thumb screw is loosened, a piece of cardboard (to be described later) inserted between the angles and up against one side of the control screw (with a small piece of the same material on the other side to act as a spacer so that the angles may be tightened.) The thumb screw is tightened and the wipe is firmly held in place on one side of the screw. To reverse (or complete) the wipe, reverse the cardboard to the other side of same screw. So much for the **mechanism** of the wipe-off device.

THE SCROLL

The scroll is simple. You already have the bed dimensions and since paper can be procured in rolls 8½" wide, all we need to do is build our scroll to these dimensions.

Cut two pieces of the 1" square wooden strips 8" long. Cut another piece 12" long. Lay the 8" pieces on top of the ONE INCH BEO STRIP and OUTSIDE OF THE ONE HALF INCH STRIPS. These will be the scroll runners and it may be seen that they fit, not IN the groove, but

on TOP of it, and straddling, the bed Center and nail the 12" piece on top of these 8" pieces, and flush with one end of them Nail a miscellaneous piece of stripping across the back of the 8" pieces to act as a rear spacer So for this unit should slide easily back and forth on the bed in the position described, i.e., straddled and atop

Next, mount the two ⅜"x3"x11½" pieces of veneer—one on each side—on the outside of the 8" runners and in back of and touching the 12" piece The bottoms of these pieces are flush with the bottoms of the runners Nail them in place securely upright after aligning with a square Across the back side of the top of these veneer pieces mount a small spacing strip to keep them the same separation at the top as at the bottom

Cut four pieces of the ½"x⅛" metal 5¼" long Hold these along the 3" sides and drill two holes in each metal strip so that all four strips may be mounted flush with the back of the scroll side supports In the end which extends in front, drill and stop a hole for the ¼" rod which is to be topped, and set aside

Thread two ¼" rods which are ten inches long, to a depth of ⅜" from each end Run the iron strips, which have been tapped, onto these rods, one at each end, and get them spaced exactly by bringing the rods close to the base of the scroll sides (outside) and then loosening or tightening as need be until the spacing is the same between the outside of the sides and the inside of the rod supports

Now, mount one rod support on the outside of the sides and so that the rod comes 1-3/16" from the top of the front spacer bar to the center of the rod support Get **back** of support flush with **back** of side and fasten securely Align the other side so that rod is exactly parallel to right angle of bed and at same height as other support—then fasten firmly Do the same with the top support, i.e., fastening first one side, then the other The centers of the two rods are 7¼" apart

Get an old broom handle Cut off a piece to fit loosely between the uprights Drill a hole in each end in the center and mount tightly, a short length of ¼" rod, which extends beyond the side supports Six inches from the bottom of the supports and in the middle of each, drill a hole to receive these studs on the broom handle With the jig saw, cut a slot in the back of the supports extending downward to these holes This allows the paper roll to be mounted on the broom handle and the whole dropped into the holes in the side supports

One-quarter inch from the top, and in the middle of the side supports, drill another pair of ¼" holes Cut another piece of broom handle and drill two more holes in it Put the broom handle in place, drive home the ¼" rods BUT—LET THE ROD ON THE RIGHT SIDE (looking at the face) EXTEND FOR ONE INCH Fasten the rods in the wood by drilling a hole through wood and metal and riveting Next, as before, if you prefer, cut a slot in the broom handle extending as far toward the ends as possible (THIS SLOT IS THE MEANS OF FASTENING THE SCROLL PAPER TO THE TAKEUP REEL—in the same manner as a film is threaded to a takeup spool in a Brownie camera)

On the right-hand side of the upper spool, and on the rod which extends an inch, mount the 3" "V" pulley In the set-screw hole, the handle is mounted Do this by removing the set-screw—thread a piece of rod about 4" long and of a size that will tap for whatever thread the set-screw hole calls for Tighten this rod in the hub while the pulley is on the shaft and, marking where it should be bent to form a handle, remove it and bend it in this direction—then replace

A little below this pulley and on the rear of the sides, mount an eye-screw To this, fasten a piece of ⅛" round belting which should go over the pulley and extend for several inches down the front edge of the side To the belt at this point, add a light spring and run this to a second eye-screw near the front edge This apparatus acts as a "brake," allowing the roll to revolve freely in one direction, while practically preventing it from backing up

In the middle of the sides, and about ½" from the tops of the "runners" drill two holes to receive the No 10 Bessemer rod Bend a piece of this rod so that it has a length just under the inside dimensions of the sides, (extending from the holes to the middle of the roll of paper) for a distance of 4" and then bend at right angles to go through the holes just drilled in the sides This wire affair is to keep the bottom roll from loosening of its own accord The wire (rod) must be held against the roll by springs fastened to two holes drilled almost half way up and eye-bolts on the front spacer If you have followed directions you have your scroll built

A means of mounting the scroll to the holder is the finishing touch to this mechanism This is done simply and quickly, by drilling a ¼" hole through the center of the holder base and the scroll front spacer Insert one of the ¼" carriage bolts from the front of the holder and drive it home so that the square shoulders seat themselves The scroll is slid in the direction of the holder, the screw going through the hole in the scroll paper, and is fastened in place by means of a wing-nut behind the latter

THE TWIST, OR WHIRL

The twist, or "whirl," is the simplest mechanical piece of the entire titler It consists of a round wooden disc, held by a firm support and with a means of revolving it and bringing it back to the exact plane it left

First, cut a round disc out of ⅜" veneer and mark the center definitely Mount the 4" shaft longer on a piece

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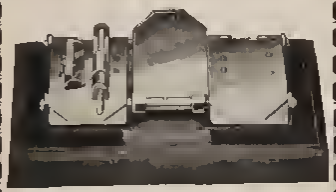

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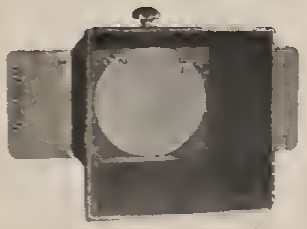

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of wood ¾ wide, 7 long and as high as necessary to bring the center of the hole to the optical axis. This last dimension I leave to my readers since they must definitely know, before getting this far, how high above the bed the center of the lens (the lens axis) is. The hanger is mounted in the middle of the width of this base by means of the two remaining ¼" carriage bolts. The base is attached to the "holder" by means of the same carriage bolt that holds the scroll in place, i.e., a hole is drilled through the base of the twist, to coincide with the carriage bolt projecting through the holder's back. It is fastened in place by the same wing-nut.

After the center of the shaft hanger hole is centered with the lens axis, mount the ½" flat-faced pulley in the exact center of the wooden disc and fasten it by means of holes drilled around the pulley, and wood screws. Drop the 3" piece of ½" shaft in the hub, tighten, and insert in the front side of the shaft hanger. Put the ½" shaft collar over the other end of the shaft and make a handle for this in the same manner as the one on the scroll. The length of this handle, however, is greater, extending to about 3¾" from the center of the shaft. At the base of the shaft, hold the hinge so that the PIVOT is resting on the hanger's feet and one side of the hinge is then fastened (by means of drilling and tapping the proper holes) to each leg of the hanger.

A slot, slightly smaller than the diameter of the handle, is made (with the metal-cutting jig saw again) in the center of the outside leaf of the hinge. This leaf is also bent in the form of an arc with the slot at the high part. At the very bottom of the slot (which is cut nearly, but not quite, through the hinge) a screw is mounted which serves the purpose of keeping the hinge from opening up too far. A small spring is inserted and fastened between the leaves of the spring to keep them apart. Bend the handle so that it is held firmly when in the slot of the hinge.

A full description of the uses of this twist will be given in the next installment, but for clarity's sake, a brief mention of its action will be given here. The handle is in its position in the slot of the hinge. A title is lined up on the face of the disc. The title is "shot" and after the proper length of time for reading, grasp the handle with the right hand, press in slightly with the thumb—and revolve the disc—fading out at the same time.

Backwind the camera to the predetermined point and fade-in on the "new" title—which is revolving in the same direction. As long as the disc is revolving it goes past the slot easily, but when it is slowed down to nearly a stop, it seats itself and holds securely. Should the handle "grab" in the slot, tighten the center screw so that it cannot "spread" so much.

Nothing about the entire titler is difficult, but everything requires reasonable care in alignment and construction. Obviously this is an instrument that should be considered as "delicate" as the camera itself—yet anyone can duplicate it with only a little patience and ingenuity, and adapt the machine to their own needs.

In the next installment, I shall describe the USES to which the titler may be put, and some of the variations of the trick effects. In the meantime, when the titler is built, paint everything (except the lead screw, ladder chain, etc.) a matte black. Even though black photographs white, when using the direct positive method of filming titles, it is necessary that all **reflected** light be avoided. The deader black, the better. A very excellent and quick-drying black is manufactured by Eastman and sold under the name of "Kodalak." By all means, avoid black enamel. Until the next time, good luck to you builders!

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An Amateur Makes Undersea Movies

Continued from Page 323

the diver Then I would get into my diving-suit and go down to rehearse the divers At a signal, the camera would be lowered to me I would take it, and aim as well as I could (it isn't very easy to sight through a small finder when you are in a diving-helmet and the camera is in a bulky box!) Then I would press my shutter-release, and the diver would do his stuff, sound carries well under water, you know, and both the diver and I could hear when the camera started and stopped Usually, I could run off the entire 35 feet of a single winding before the diver was ready to come up, in fact, I could have shot a whole 200-ft magazine of some of them—and still be through shooting before the swimmer was out of breath! Of course, after each 35 feet of film, the camera would have to go up for winding, and as this necessitated removing it from the box, and then sealing it up again, you can imagine what slow work it was

"The refraction of the water was a real problem it narrowed down the lens-angle tremendously Using the regular two-inch lens, I found that the refraction narrowed the angle so much that the result on the screen looked as though I'd been using a three- or four-inch lens. Even with a 24mm lens — normally a wide-angle lens—I'd get about the same result as one would with a two-inch in the air. With my subject 16 feet from the camera, I'd be hard-pressed to get a full-figure shot

"The matter of exposure fooled me badly. There wasn't room in either my diving-suit or the camera-box for an exposure meter, and while at first I was sure that, at a 50-ft depth, I'd get about the right exposure with the lens wide open at f 2.5, I soon learned that even stopped down to f 6.3 or f 5.6 m, exposure would be a bit high on the Super-pan film I was using

"Another troublesome problem was the effect of the hot, moist atmosphere and the cold water Naturally, the air in the camera-box would be hot and moist and when the box was lowered into the cold water of the depths, this moisture would condense, usually on the window-glass in front of the lens, giving the same foggy effect as steam condensing on a cold window-pane A small container inside the case, filled with calcium chloride, will take care of this—but unfortunately, I had none available, so I had to trust to luck, and hope that the moisture wouldn't ruin my shot Sometimes I was lucky!

"The currents were often very troublesome. often, working in a strong current, I'd be straining to keep the camera steady against the stream, when suddenly the current would cease—and I'd have on unintentional and thoroughly unwanted pan

"Aside from helping me hold the weight of the heavy camera-box, the underwater buoyancy produced some surprising effects I found that I could jump around like an acrobat—20 feet or more at a bound was easy But it wasn't so easy to keep my balance after landing—and I didn't dare fall forward or sideways, for fear of breaking the windows in my helmet Also, the coral gave me many bad moments much of the coral there is poisonous, and sharp-pointed If I had scratched my bare hand, or ripped my suit, it would have been just too bad! Really, the coral was the greatest danger, I suppose it would make a better story if I gave credit for that to the sharks—but to tell the truth, after the first few dives, I didn't worry about them a bit, for I learned that the Tahitian

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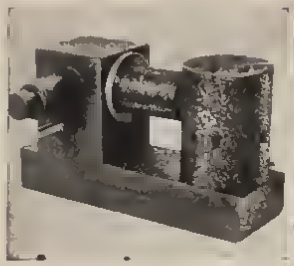

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Let's Talk About Lenses

Continued from Page 317

Without new kinds of glass, lens design would very probably have halted, for it is impossible to correct every fault simultaneously by the shape of the lens or its elements alone. The growth of optical efficiency, then, can be dated from the experimental work at Jena in finding new glasses with which to make lenses. The growth of any art depends largely upon the improvements which are made in the tools and materials available to designers and craftsmen.

I see that we are running short of space for this installment, and because the construction of anastigmats is so interesting and so varied, suppose we take up the modern anastigmat lens next month. This lens is the most important we use today, and it would scarcely be possible to do it justice in the time remaining this month. So, until next month, it might be a good plan to review this month's and last month's discussion of lens faults and their corrections, so we may be able to understand fully just why the anastigmat is so fine an objective.

The Family Physician

Continued from Page 322

Scene 25. Medium shot of Junior seeing what Buddy is doing; immediately he does the same. Then Buddy tries to get at the doll with his great rip saw. Junior holds him off.

Scene 26. "Can't you see that the leg is off already, no more cutting here, we must sew the leg on."

Scene 27. Medium shot of group. Buddy, disappointed, throws his tools down and Junior sets to work with a needle to sew the Doll's leg. (No need to show Junior sewing on the Doll's leg, because this can be done between shots, make him do the motion while his hands are hidden under the towel over the Doll.)

Buddy holds the Doll down while Junior is working and from time to time he feels the Doll's pulse. (you can make this operation as short or as long as you want to.) Finally Junior has finished, with a grand gesture he invites Maryjane to pick up the Doll.

Scene 28. Medium shot of Maryjane picking up her Doll, but look! the boys had sewn on the towel as well.

Scene 29. Pa laughingly takes his pocketknife and cuts off the threads, he pats the boys on their backs, he sure enjoyed the performance.

Scene 30. Close shot of Junior taking out a long roll of paper from his pocket and presenting it to Pa.
Title: "Here is your bill, cash only."

Scene 31. Same as 30. Laughingly Pa pulls out his change and gives the boys some pennies. Satisfied, they pack up their things and with Maryjane waving a goodbye they scoot out of the picture.

Wheels of Industry

Continued from Page 326

a lens diaphragm unnecessary and thus simplifying correct timing of exposures.

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Practical Suggestions for Cinephotographers

Continued from Page 324

can get to your subject without going out af focus Make a mork on the ground Then retreat as far as you wont ond the campasitian of your shot allows

The rest is easy Advance as your actian demands (a cleon continuol advonce will be the most notural) and a nice clean shot should be the result

CRENNAN MAKES SUPER-CRITICAL FOCUSER

● Ollie V Crennan, of New Rochelle, New York, shows how he combined the well-known Bell & Howell "Focusing Micrascope" with his Cine-Kodak Specol "The micrascope," he writes, "contoins a ground glass covered by a 16mm aperture - mosk Behind the ground glass is a powerful magnifying eyepiece (10x), while any standard 16mm lens may be screwed into the front end of the magnifier

"I have mounted the device on my Cine-Kadak Special, using an L-shoped, remavable brocket The focusing microscope is pivot-mounted in this arm, with o set-screw and scale adjustment to take core af adjustments far parallax The whole assembly is set so clase to the camero door thot the parallax odjustment is very slight, except for extremely close work at distances of fram two to four feet The register af picture fram top to bottom is very accurate

"When sighting through the finder, the picture is brought into shorp focus by warking the regular focusing odjustment on the lens mounted in the focus-finder The reoding given an this lens' focusing scale con then be reod, ond the toking-lens on the camera set at the some figure In this manner, one is assured af having his pictures olways in focus, as the graund gloss of the finder and the camero's film-aperture are in virtually the some plane

"The photo shows the Cine Speciol with the 2-inch Eastmon lens in ploce, ond the finder fitted with an f 2, 50mm Leitz ("Leico") "Summor," which hos a sun-shade on

"This whole outfit may be used on top af the comero by merely turning the aperture mosk araund in the finder"

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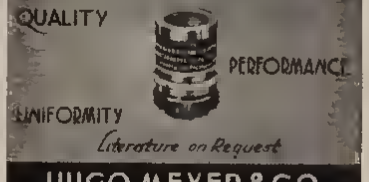

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He is an ardent amateur who knows his hobby from A to Z.

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CAMERA CRAFT

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TINTS WITHOUT TROUBLE

● All of us have admired the tinted (colored) silent movies of a few years ago Last year in the AMERICAN CINEMATOGRAPHER several articles were published, telling how to tint and tone your own 16mm or 8mm films These effects are easy to get but the process is more or less messy, involving as it does immersing the film in one or more chemical baths Here is a method of getting similar effects **in projection.**

Everyone probably has seen the "color-wheel" and similar commercial attachments for 16mm projectors, they give the tinted effect by placing a colored glass or gelatin in front of the projector-lens Any amateur, however, can build himself a very acceptable color-wheel for about 35 cents—and get the same effects Exactly how you build it will depend upon the type of projector you use, and on your projection methods Essentially, the device consists of a cardboard disc or wheel, mounted in front of the projector-lens, so it can be rotated In the disc are several circular openings, slightly larger than the diameter of the lens One of these is clear, and the others are covered with a sheet of colored cellophane (which you can get at any five-and-ten-cent store) For general use, I would suggest, in addition to the clear opening, four colors blue, green, red, and light amber Green for landscapes—blue for seascapes and predominant cloud-effects—red for fires, sunsets, etc —and light amber for interiors and general warm effects

You can support this color wheel in several ways either from a clamp on the projector itself, or from a wooden block attached to the table on which the projector stands And—here's a tip about using the color-wheel you don't want to change colors in the middle of a scene, as a rule, and it's hard to change accurately between scenes—so put in a short title between such scenes, and you can easily make the change during the time the title is on the screen

A friend of mine once built a similar outfit which gave him some very unusual effects It was a simple frome-like affair something like a lantern-slide projector, or perhaps a filter-holder It held a clean lantern-slide, one-half of which was tinted a faint blue, the other green, the slide was, of course, divided horizontally It took quite a bit of testing to get the thing adjusted right, but once it was right it gave a very pleasing effect, softening the picture marvellously, giving a faint blue tinge to the sky, and green to the foreground And, surprisingly, he found this color-divider could be used practically all the time, regardless of the subject or shot Try it!

ARTHUR CAMPBELL.

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WANTED

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MISCELLANEOUS

WILL TRADE 1932 Buick Sport Coupe for DeBrie or Bell & Howell 35mm camera Will assume Fred Mayer, 624 North Plymouth Blvd., Apt. 7, Hollywood Phone GL 6426

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FOR SALE—1 Mitchell Silenced Camera, complete 6 Bell & Howell 1000-ft. magazines, 1 Mitchel Friction Head Tripod American Cinematographer, care Box 245

EXCHANGE

EXCHANGE LIBRARY—Sound-on-film 16mm features and shorts, also 8mm and 16mm silent films of every variety Harry Mendelwager, 182 West 49th St., Bayonne, New Jersey N

TRICKS GADGETS

Another Contest

Here's how it works. Send us in tricks you have done in filming with your 8mm. 9½mm or 16mm camera. Explain them to us so that we can explain them to others in the pages of American Cinematographer.
For every one we publish you will be entitled to your choice of one of the prizes listed below.

By Gadgets we mean little pieces of equipment you have built, designed or devised. Equipment that works. Little gadgets you have added to your camera, projector or otherwise. For instance, we heard of one fellow who built a splicer out of a mouse-trap . . . that's a gadget.

What kind of gadgets have you made . . . what sort of tricks do you do with your camera or equipment? If necessary send us a rough sketch or a snap shot of your equipment if it will help describe it better and quicker.

Here's Your Chance to Win Equipment or Film

Frequently we have published what might be termed tricks. Such as making distorted effects by pouring sweet-oil over a glass in front of the film. Others have been published from time to time.

In the way of gadgets we have reported many things from the building of a complete 16mm camera by amateurs down to making their own reels.

What Have You Done?

Here are the prizes . . . you may make your choice of any one of them

- Beltipod
- Filter Holder
- Choice of Filter
- Splicer
- Half-Dozen 16mm Reels
- Half-Dozen 16mm Cans
- 3 Reels and 3 Cans
- 100-ft. Roll of 16mm Pan Film
- Two Rolls of 8mm Film
- 8mm Splicer and Rewind
- Humidor Can Case for 12 Reels
- 22x30 Beaded Screen
- 3 Clamp Lamp Reflectors with 3 Photoflood Lamps
- One Dozen Photoflood Lamps

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